Endangered Species Management Plan

For

Fort Riley, Kansas

prepared by

Directorate of Environment and Safety
G3
Staff Judge Advocate
Fort Riley, Kansas

Revised June 2004

We, the undersigned, do agree to abide by the conditions set forth herein in the document entitled, "ENDANGERED SPECIES MANAGEMENT PLAN FOR FORT RILEY, KANSAS."

Approving Official:

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Acronyms/Abbreviations

COE	U.S. Army Corps of Engineers
DA	Department of the Army
DBH	Diameter at Breast Height
DES	Directorate of Environment and Safety, Fort Riley
DoD	Department of Defense
ESA	Endangered Species Act of 1973
ESMP	Endangered Species Management Plan
GIS	Geographical Information System
I/E	Information/Education
ITAM	Integrated Training Area Management
KDWP	Kansas Department of Wildlife & Parks
MPs	Military Police
NRD	Natural Resources Division, Fort Riley
NWI	National Wetland Inventory
POC	Point of Contact
PMO	Provost Marshal's Office
SNCORC	Senior NCO Refresher Course
T&E	Threatened and Endangered Species
TRI	Training Requirements Integration
USFWS	United States Fish & Wildlife Service

ENDANGERED SPECIES MANAGEMENT PLAN

Executive Summary

Army Regulation 200-3 requires Army Installations with federally listed threatened or endangered species present to develop Endangered Species Management Plans (ESMPs). The purposes of the ESMP are to present information on threatened and endangered (T&E) species, to discuss the protection of these species, to define conservation goals, and to outline a plan for management of the species and their habitats to achieve stated conservation goals.

The ESMP considers five species; the bald eagle, least tern, piping plover, Henslow's sparrow and Topeka shiner. The bald eagle, least tern and piping plover and Topeka shiner are federally listed as threatened or endangered. The Henslow's sparrow is classified as a federal species of concern.

To protect bald eagles, Fort Riley will: review construction projects involving new or existing aerial structures; establish "minimum disturbance" buffer zones; educate installation personnel; enforce a "no net loss" rule for riparian timber; establish "no disturbance buffers" around roosts and nests; perform annual surveys; map riparian timber and maintain a database of important eagle areas.

To protect least terns and piping plovers, Fort Riley will: review all aerial transmission line projects; protect existing least tern/piping plover habitat from human disturbance; map existing least tern/ piping plover habitat; and perform annual surveys.

To protect Topeka shiners, Fort Riley will: annually seine all streams with Topeka shiners; survey streams with apparently suitable habitat at least twice every five years; review activities which may affect streams; develop an environmental awareness program on maintaining stream quality; restore stream habitat; control invasive/non-native fish populations; and, restrict the construction of dams on Topeka shiner streams.

ENDANGERED SPECIES MANAGEMENT PLAN
FORT RILEY MILITARY RESERVATION, KANSAS

SECTION 1.0 INTRODUCTION

1.1 BACKGROUND

Endangered Species Management Plans (ESMPs) for Army Installations with federally listed threatened or endangered species present are required by Army Regulation 200-3, Chapter 11, as a means of ensuring complete fulfillment of the military mission. ESMPs are to be written collaboratively by the Environmental Directorate, Training Directorate and Environmental Law Specialist. The objectives of an installation ESMP are: (1) to present information on the threatened and endangered (T&E) species which occur on an installation; (2) to discuss the protection of these species; (3) to define conservation goals; and (4) to outline a plan for management of the species and their habitats to achieve stated conservation goals.

Fort Riley has an ESMP that is the mechanism for ensuring compliance with the Federal Endangered Species Act (ESA) of 1973 and the Kansas Nongame and Endangered Species Conservation Act of 1975. The Directorate of Environment and Safety (DES) wrote the ESMP, with assistance from the G3/Directorate of Plans, Training and Mobilization and the Staff Judge Advocate (SJA). It is based on and consistent with AR 200-3, the ESA, the Kansas Nongame and Endangered Species Conservation Act, the Bald and Golden Eagle Protection Act of 1940, and management recommendations the U.S. Fish & Wildlife Service (FWS) provided Fort Riley since 1995.

1.2 ESMP REVISIONS

This plan is a revision of the 2001 ESMP signed by Fort Riley's Installation Commander. It takes into account changes in species status and state-designated critical habitats. It also adjusts the level of consultation required with the United States Fish and Wildlife Service (USFWS) concerning bald eagle "minimum disturbance areas" and streams of potential habitat for the Topeka shiner. DES will evaluate the potential for effects within the minimum disturbance zone for bald eagles and determine if the action needs to be reviewed by the USFWS. The USFWS will only be contacted if the installation determines that the project "may adversely affect" bald eagles. DES will still be required to consult with the USFWS for projects that involve the removal or alteration of any bald eagle habitat or those that may have a significant negative impact to bald eagles.

The level of consultation required for the Topeka shiner has also changed. Fort Riley will no longer be required to contact the USFWS regarding all projects that occur near streams in which Topeka shiners have not been documented but contain potential habitat. Only in the case of when the installation determines that the project "may

adversely affect" Topeka shiners if they were present, will the DES consult with the USFWS.

The 2004 ESMP has been written for five species: the bald eagle, least tern, piping plover, Topeka shiner and Henslow's sparrow. This revised version no longer contains provisions for the peregrine falcon, which was removed from the federal list of T&E species in 1999.

State designated critical habitat for the bald eagle remains the same. However, it has been increased for the Topeka shiner. The State of Kansas considers streams and creeks with recent collection records of Topeka shiners to be State designated critical habitat. Topeka shiners were found in Honey creek in 2003 for the first time. Honey Creek now joins Wildcat, Wind, Little Arkansas and Seven-mile Creeks as being listed as state designated critical habitat for the Topeka shiner. Fort Riley has at this time been proposed for exclusion by the USFWS from their list of proposed critical habitat of the Topeka shiner because it was determined that our Integrated Natural Resources Management Plan was functional and effective towards conservation of the species. The changes in listing of critical habitat do not have substantive implications for the military training mission.

Protection of bald eagle no disturbance and minimum disturbance zones at Madison Creek have been clarified. Additionally, consultation levels for no disturbance and minimum disturbance zones have been refined to include programmatic provisions for approval of actions that occur within those areas.

Law enforcement jurisdiction is shared jointly with the KDWP and the USFWS. Law enforcement officers from these two agencies have the authority to enforce applicable federal and state laws and regulations on the Fort Riley Military Reservation. KDWP Conservation Officers frequently interact with the installation's Conservation Officer and Military Police (MP). KDWP officers have cooperated with Provost Marshal's Office (PMO) personnel and USFWS special law enforcement agents to investigate poaching cases on-post and cases of poaching by soldiers off-post. They do not have the authority to cite individuals for violations of Fort Riley regulations. Only MPs and the civilian Conservation Officer have that authority.

Instances where law enforcement personnel can be effective at protecting T&E species include keeping recreationists from entering off limit areas for T&E species and enforcement of the prohibition of baitfish seining in creeks that are known to, or may potentially, contain Topeka shiners.

A section for the Henslow's sparrow, which is considered a Species of Concern, was added. Although this designation does not carry any legal requirement for consultation, it is included here because of the potential significant impact to the military mission if the species were to be listed in the future. The goal of the Henslow's sparrow management

plan is to monitor the species and to increase the population on Fort Riley and the surrounding area.

There are no substantive changes in conservation goals or management prescriptions and actions for federally listed species. This version continues to ensure accomplishment of the military mission in harmony with the ESA and Kansas law. Time and personnel requirements in the updated version are similar to those of the 2001 version. Although the peregrine falcon section has been removed, most of the prescriptions and actions formerly described in that section are necessary for conservation of the bald eagle, least tern or piping plover, so they will continue to be performed.

Fort Riley's ESMP has fostered cooperation among DES, SJA and G3 to accomplish Fort Riley's mission. The ESMP has provided a planning platform to accomplish training and ensure legal compliance with state and federal law.

1.3 ESMP COMPONENTS

1.3.1 Species Addressed. Species included in this report and their current classifications are shown in Figure 1. All scientific names reflect currently accepted nomenclature. The Topeka shiner resides on Fort Riley for the entire year. The majority of bald eagles are present throughout the winter and, if nesting occurs, in small number throughout the year. The Henslow's sparrow occurs on the installation from spring through summer. The least tern and piping plover occur rarely. The ESMP has incorporated the best information available for each species in formulating management prescriptions and actions. The result is that some plans are considerably more detailed and complex than others. This reflects either a greater body of knowledge regarding that species, a greater potential for management, or both. The separate species plans are written to stand alone, but are also individual parts of the larger management document.

1.3.2 Habitats Available. Habitats existing on Fort Riley may be divided into terrestrial and aquatic categories. Many species occurring on the installation are segregated on this basis, while some will use habitats in both categories. Terrestrial habitats include native prairie, cool-season grassland, croplands planted as wildlife food plots or perimeter firebreaks, savanna, shelterbelts, and woodlands. Aquatic habitats include ponds, marshes, streams, reservoir coves, rivers, and sandbars.

The water levels of most aquatic habitats on Fort Riley are not controlled directly by Fort Riley. These areas are either dependent on natural precipitation to maintain water levels or are controlled, to a certain extent, by the operations of the Corps of Engineers. Aside from water levels, aquatic habitat enhancement may target water quality and vegetation control.

Terrestrial habitats, while still affected by weather extremes, provide more potential for manipulation and management. Terrestrial habitat enhancement may include planting of trees and filter strips. The management plans presented in this report consider the actual ability to manage for fish and wildlife species.

1.3.3 Conservation Goals and Management Actions. Each management section specifies conservation goals for the species being discussed. Management prescriptions and actions are identified to achieve the conservation goals specified. A certain degree of overlap between management actions occurs for different species. Therefore, conducting certain actions may benefit multiple species simultaneously. Other actions are more species-specific, with non-target species affected in only negligible ways. The management actions identified fall into six broad categories of activity. These activities may be described as: (1) protecting animals from human-induced injury and mortality; (2) protecting animals from human disturbance; (3) mapping and evaluating habitat areas; (4) protecting and conserving habitat; (5) long-term population surveys; and, (6) providing information contained in plans to Fort Riley personnel.

1.3.4 Time and Personnel Requirements. Each management section is intended to be usable independently from other sections. Thus, each section presents an estimate of total staff-days to complete the actions it prescribes. The cumulative total of labor required, as independently listed in each section, to accomplish all actions for all species in the revised plan is approximately 256 staff-days annually.

The ESMP was developed to help the Department of the Army (DA) determine strategies for conserving and managing the rare flora and fauna that may occur on Fort Riley. This represents a very positive step forward by DA in its overall attempt to become more proactive in managing its natural resources. The success or failure of such programs will help determine the fate of many rare species.

This ESMP does not obviate ESA Section 7 consultation requirements with the USFWS, or replace the need to obtain special permits from the Kansas Department of Wildlife & Parks. Any action that may directly or indirectly affect a federally- or Kansas-listed species, or that species' preferred habitat, will be coordinated with the USFWS and KDWP through the DES, Conservation Division.

Figure 1 Species considered in the Endangered Species Management Plan for Fort Riley Military Reservation, Kansas.

Species	Federal Listing*	State Listing*
Least tern (*Sterna antillarum*)	E	E
Bald eagle (*Haliaeetus leucocephalus*)	T	T
Piping plover (*Charadrius melodus*)	T	T
Topeka shiner (*Notropis topeka*)	E	T
Henslow's sparrow (*Ammodramus henslowii*),	SoC	SINC

*Classification abbreviations: E = endangered, T = threatened, SoC = Species of Concern; SINC = Species In Need of Conservation

SECTION 2.0 BALD EAGLE MANAGEMENT PLAN

Executive Summary

Current Species Status: The bald eagle is federally listed as threatened and Kansas-listed as threatened. It is distributed across most of the continental United States, Canada and Alaska. The largest concentrations occur in Canada and Alaska. Primary eagle habitat on Fort Riley exists along shorelines of the Kansas, Republican, and Smoky Hill rivers and Milford Lake. Fort Riley is used as a wintering and migration area by bald eagles and, in 2004, for nesting.

Habitat Requirements and Limiting Factors: Bald eagles require riverine and lacustrine habitats that have large trees nearby to meet breeding, wintering and nesting needs. Eagle habitat must provide adequate prey resources, isolation from human disturbance, and trees for roosting, nesting and foraging. Threats to eagles on Fort Riley include habitat destruction, human disturbance of perched eagles, eagle electrocution on power lines, and flying birds striking overhead power lines, towers, guy lines or similar structures.

Management Objectives: Protect bald eagles and their habitat on Fort Riley.

Conservation Goals: The conservation goals are to protect individual eagles from "takings" while they are present within the installation's boundaries, and to maintain existing habitat on Fort Riley. The goals of this plan do not include achieving a specific number of bald eagles. The number of bald eagles on Fort Riley is likely as dependent upon the severity of the winter and open water conditions in habitats north of the installation as it is on local habitat conditions. Therefore, yearly fluctuations in eagle numbers on Fort Riley serve as poor indicators for changes in habitat quality.

Actions Needed: Fort Riley will: (1) Protect and conserve habitat and wintering bald eagles; (2) Protect nesting bald eagles on Fort Riley; (3) Identify actual and potential roost sites on Fort Riley; (4) Protect actual roost sites; and (5) Monitor eagle use of Fort Riley.

Specifically, Fort Riley will: (a) Review all projects to construct new or modify existing aerial structures for need to incorporate "eagle-friendly" procedures; (b) Establish “minimum disturbance” buffer zones along river and Milford Lake shorelines; (c) Educate installation personnel about the requirement to protect eagles; (d) Enforce a "no net loss" rule for riparian timber extending 100 m from the water's edge; (e) Protect with "no disturbance buffers" any identified communal roost or nesting site: (f) Perform annual surveys to document eagle use of Fort Riley; (g) Map riparian timber, and (h) Develop a database containing important eagle-use areas.

Total Estimated Cost of Conservation Actions: It is estimated that accomplishing the tasks involved in bald eagle management on Fort Riley will require 70 staff-days annually. The primary cost involves staff salary.

BALD EAGLE MANAGEMENT PLAN

2.1 INTRODUCTION

The objective of this Endangered Species Management Plan (ESMP) is: (1) to present information on the bald eagle (*Haliaeetus leucocephalus*), a species federally listed as threatened and Kansas-listed as threatened, which is present at Fort Riley, Kansas (Fort Riley); (2) to discuss the protection of the bald eagle on Fort Riley; (3) to define conservation goals; and (4) to outline a plan for management of the species and its habitat that will enable achievement of conservation goals. These purposes are consistent with the management recommendations that were provided to Fort Riley by the U.S. Fish & Wildlife Service (USFWS) since 1995.

This ESMP is based on and is consistent with the Bald and Golden Eagle Protection Act of 1940, the Endangered Species Act of 1973 (ESA), the Kansas Nongame and Endangered Species Conservation Act of 1975 and Army Regulations (AR 200-3). This plan does not supersede ESA Section 7 consultation requirements with the USFWS, or replace the need to obtain special permits from the Kansas Department of Wildlife & Parks (KDWP). Before performing any action that may directly or indirectly affect the bald eagle or the eagle's preferred habitat, the proponent must first coordinate with the USFWS and KDWP through the Fort Riley Directorate of Environment and Safety (DES), Conservation Division.

2.2 SPECIES INFORMATION

2.2.1 Description. The bald eagle is the national symbol of the United States. It is the largest raptor east of the Rocky Mountains with a body length ranging from 32-37" and a wingspan of 76-90". Adult birds are unmistakable in the field, with their white heads and tails contrasting sharply with the dark brown body plumage. Immature bald eagles are all dark with some degree of white mottling occurring on the body, and may be confused with golden eagles (*Aquila chrysaetos*), turkey vultures (*Cathartes aura*) and large dark-phase hawks (*Buteo spp*.). Immature bald eagles are distinguished from immature golden eagles by having whiter mottling on the breast, back, head, tail and underside of the wings (not just the primary feathers). A white patch where the underside of the wing meets the body is a definitive characteristic of young bald eagles (Stalmaster 1987). Bald eagles may be differentiated from vultures and hawks by their larger size, flatter flight profile, longer-necked appearance and more massive bill.

2.2.2 Habitat/Ecology. Bald eagles are highly associated with and attracted to water. They are dependent on aquatic food sources and habitats for their survival (Stalmaster 1987, Steenhof et al. 1980). Bald eagles are most frequently observed using riverine or

lacustrine habitats, particularly those with large trees in close proximity. However, habitat for this species is more inclusive than merely trees and water. It involves all of the ecological components that eagles require for survival, including prey availability, isolation from disturbance, and other features that we may not fully understand (Stalmaster 1987).

2.2.2.1 Prey availability. Bald eagles feed primarily on fish, with injured or sick waterfowl and carrion also being taken as opportunity presents. Generally, prey availability is not a problem as long as eagles have access to open water feeding areas.

2.2.2.2 Isolation from disturbance. Isolation and protection from human disturbances are factors that appear important to bald eagles. The amount of isolation necessary is not completely clear. Stalmaster and Newman (1978) recommended protecting areas 75-100 m wide (250 m or more in open areas such as river banks) to minimize disturbances to wintering eagles. The tolerance to human disturbance appears to vary greatly among individual bald eagles (Mike Lockhart, USFWS, pers. comm.), with older birds, generally, being more intolerant than juveniles or subadults (Stalmaster and Newman 1978).

2.2.2.3 Diurnal perch sites. Specific perch sites preferred by bald eagles vary depending on time of day and weather conditions. Selected daytime perches are most often the tallest trees in the forest canopy, particularly dead trees or those with open branches that are near a predominant water source or other feeding areas. Such trees provide the greatest visibility for a perched eagle, as well as an unobstructed flight path to and from the tree (Chester et al. 1990, Stalmaster and Newman 1979).

2.2.2.4 Roosting habitat. Bald eagle roosting habitat consists of tall trees that provide protection from the wind and isolation from human activity. Eagles may use several roosts on a single wintering site (Edwards 1969, Ingram 1965). Use of the different roosts is dependent upon weather conditions. Eagles tend to be quite selective in their choice of roosting sites on extremely cold nights (Dunstan 1974), selecting areas well-protected from the elements (Bowes 1975, Swisher 1964). Eagles roost communally at cold night roosts, often with 60 or more eagles at a single location (Stalmaster 1976).

A South Dakota communal roost consisted of a 5-ha stand of mature cottonwood trees on a floodplain woodland approximately 75 m from the river. A smaller stand of cottonwoods on the riverbank provided the roost some protection from the prevailing winds (Steenhof et al. 1980). Cold night roosts in Washington were most often dense stands of evergreens with thick foliage for protection from the elements. Actual roost trees within these stands generally were taller than the surrounding canopy (Stalmaster and Newman 1979). While proximity to a food source appears to be a critical element in preference of daytime perches, it may not be a determining factor in nighttime roost selection (Steenhof et al. 1980, Stalmaster and Newman 1979).

Communal roosts apparently are used annually. Eagles consistently have returned to the same roosting area on Fort Riley (1993-2003). Eagles may remain on or near Fort Riley roosts all day under extreme weather conditions. Destruction or modification to these sites may alter them to the extent that they no longer meet the eagles' needs on the coldest nights.

2.2.2.5 Nesting biology. Bald eagle nesting habitat is similar to its wintering habitat. A good area has a suitable nest tree, many perches that provide a view of the territory, and a feeding area. Nest trees are usually located along the shoreline of a river or large lake, but may occur two miles or more from such areas (Hall and Legrand 1989, Anthony and Isaacs 1989). Nest trees are the largest, most dominant trees in the stand, and are relatively isolated from human disturbance. Typical nest trees provide unobstructed flight paths and excellent visibility (Hall and Legrand 1989).

Bald eagles are territorial and defend the area around their nest from other birds. They tend to remain on their territory throughout the year unless food becomes too scarce or weather conditions too severe. Eagles will reuse the same nest annually, up to 30-40 years (Thompson and Ely 1989).

Eagles are monogamous. Their nest is built of sticks and placed in a crotch 15 m or higher above ground. A nest is up to six feet in diameter and four feet deep. Average clutch size is two eggs. The incubation period lasts 34-36 days. The nestling period lasts 10-12 weeks and is followed by a 3-4 month fledgling period. Both adults share parental duties.

2.2.3 Distribution. Bald eagles historically ranged across most of North America, from central Alaska and Canada to northern Mexico. Eagles concentrated around large bodies of water within this range. Pre-European population estimates vary from 250,000 to 500,000 birds (60 Federal Register 36000). The number of breeding pairs of eagles in the continental states had fallen to approximately 420 by 1963. This number rebounded to approximately 5,700 pairs in 1999 (USFWS 1999). Bald eagles are seen regularly over most of Kansas, with winter concentrations of thirty or more birds at the larger lakes (Thompson and Ely 1989).

Primary diurnal habitat for bald eagles on Fort Riley exists in the riparian woodlands that border the Kansas, Republican, and Smoky Hill rivers, as well as the timbered shorelines of Milford Lake (Figure 2). The KDWP has designated critical habitat for bald eagles to include all lands and waters within a corridor along the main stem of the Kansas River, Smoky Hill River and Republican River and extending 100 yards landward from the rivers' ordinary high water mark on each bank.

Additionally, the KDWP has designated as critical habitat all lands and waters that lie within five air miles of public lands on Tuttle Creek Lake and Milford Lake. The DES, Conservation Division requested and received from the Ecological Services Section of the KDWP an interpretation of what areas are protected within the five air miles buffer

surrounding Milford and Tuttle Creek lakes. The KDWP stated that because of the designation, coordination with the KDWP must occur prior to undertaking any activity that would remove trees or disturb "activity areas" within 300 yards of lakes' shorelines, or, that would remove trees or disturb eagles at roosts or nesting sites within 5 air miles from public lands surrounding lakes.

Three communal roost sites have been identified on Fort Riley; two along the Kansas River, and the other located along Madison Creek upstream from Milford Lake. Undiscovered roosts may exist elsewhere, including near Farnum Creek Cove of Milford Lake, and in the riparian woodlands bordering the Kansas, Republican, and Smoky Hill rivers.

Annual diurnal eagle surveys on Fort Riley were initiated in 1993. Surveys were performed irregularly prior to 1993. The number of bald eagles along the primary river systems and Milford Lake at points easily accessed by vehicle is counted during these surveys. Approximately 66% of the riverine and 50% of lacustrine habitat located on Fort Riley is observed during each survey (Figure 3). The number of eagles counted per survey has ranged from 0 to 164. Eagles use all portions of the habitat surveyed. Madison Creek Cove on Milford Lake, the confluence of the Smoky Hill and Republican rivers, and a stretch of the Kansas River behind the First Territorial Capitol are the most frequently used areas.

Roost surveys were initiated in 1994. The number of eagles using the roosts varies nightly. The highest documented count occurred on January 9, 1999, when 388 bald eagles were counted. Eagles apparently use the roosts for thermal protection from extreme winter weather conditions.

Roosting bald eagles are generally expected to be in the Fort Riley area from about October 15 to about March 31. However, these dates are variable, and eagles actually have been observed no earlier than October 22, and as late as May 7. Eagles have been observed at roosts from October 31 to March 29. The typical pattern of eagle density on Fort Riley is for a few eagles to arrive during October. Numbers remain low in November and early December, followed by a general increase in eagles until a peak is reached in late January or early February. After that time, numbers decrease until the majority of eagles have left the area by late March.

Fort Riley is used by bald eagles primarily as a wintering and migration area. An active nest was verified in 2004 in the Madison Cove Area. Kansas supported a single nest in Douglas County in 1989. There were 15 active nests in 2003, in which 32 eagles were fledged.

2.2.4 Reasons for Listing. The first major decline in the bald eagle population began in the mid to late 1800's and was due to habitat loss and direct killings of the species. Passage of the Bald and Golden Eagle Protection Act in 1940 resulted as a response to the population decline. This act prohibited humans from taking or possessing any eagle

part, and resulted in a partial recovery or a slower decline of the species in most areas. Eagle numbers again began to decline after World War II due to the effects of the pesticide DDT and its metabolites. As eagles accumulated these chemicals in their bodies, adult birds were poisoned, eggshells were thinned to the point that they broke during incubation, and embryos developing in otherwise functional eggs became malformed. The encroachment of human developments upon nesting territories also caused eagles to abandon many of their former nest sites. This second major decline resulted in listing the bald eagle as endangered under the Endangered Species Protection Act in 1967. The bald eagle was subsequently listed as endangered under the ESA in 1978 for the lower 48 states. In 1995, the USFWS reclassified the bald eagle from endangered to threatened status [60 Federal Register 36000, July 12, 1995]. In 1999, the USFWS proposed to remove the bald eagle from the list of endangered and threatened wildlife in the lower 48 states (64 Federal Register 36453-464, July 6, 1999).

2.2.5 Conservation Measures. Recovery activities carried out for bald eagles include protecting nesting sites from disturbance, incorporating important habitat areas into the National Wildlife Refuge System, reintroducing eagles into unoccupied habitat, banning DDT, and conducting vigorous law enforcement and public awareness campaigns to reduce illegal shooting of eagles.

2.3 CONSERVATION GOALS

2.3.1 Establish procedures to protect individual bald eagles while they are present on Fort Riley.

2.3.2 Maintain existing abundance and quality of bald eagle habitat on Fort Riley.

2.4 MANAGEMENT PRESCRIPTIONS AND ACTIONS

2.4.1 Protect bald eagles on Fort Riley from human-induced injury and mortality.

Many federal and state laws and regulations exist to protect bald eagles. These include prohibitions against shooting or trapping and the requirement to use non-toxic shot when hunting waterfowl. Therefore, it is believed that additional restrictions against shooting bald eagles on Fort Riley are unwarranted. It is also believed that additional education about these restrictions is unnecessary. Hunters and other recreationists are frequently checked by a civilian conservation officer and military police to ensure a high compliance rate with federal, state and Army laws and regulations.

Other hazards to bald eagles include electrocution on power lines, tower and line strikes and poisoning. The USFWS documented the causes of 33 bald eagle deaths over a 10-year period in Kansas starting in 1979 (Figure 4). Electrocutions directly attributable to power lines accounted for 35% of the deaths, while 13% resulted from flying eagles striking either a power line or a tower of some sort. Further, at least a portion of the

32% of cases that remained “undetermined” due to advanced stage of carcass decay were birds found beneath or near towers or power lines. Therefore, it can be concluded that during this period at least 50% of all known bald eagle deaths in Kansas were directly attributable to some man-made structure, primarily overhead power lines. Many transmission lines, poles, and towers exist on Fort Riley that may pose some degree of threat to bald eagles.

2.4.1.1 Prescription. Minimize the risk of eagle collisions with aerial structures.

Action. Techniques are available to mark or otherwise design aerial structures so that the hazard of eagles colliding with them is eliminated or greatly reduced. Line markers, such as aviation balls and colored spiral dampers, and similar markers for towers and guy lines may be used to make these structures more visible to eagles. Any projects to construct new or modify existing aerial structures on Fort Riley will be reviewed for need to incorporate line markers. Consultation with the USFWS will occur for all projects that are determined to result in a “may adversely affect” or “likely to adversely affect” a T&E species or migratory birds. The USFWS has established guidelines for the sitting of both communication towers and wind-powered generators. These guidelines will be used during the review of all new projects. Areas of particular concern are within one mile of a river or Milford Lake shoreline because eagles use rivers and lakes as travel lanes. Many of these structures may be the responsibility of public utility companies rather than Fort Riley. Fort Riley, however, maintains authority over construction within its property boundaries

2.4.1.2 Prescription. Minimize the risk of eagle electrocution on power lines.

Action. To safeguard against eagle electrocution, any projects to construct new or modify existing electric transmission lines on Fort Riley will be reviewed by the DES, Conservation Division prior to project implementation. Techniques outlined by Olendorff et al. (1981) will be incorporated into the project designs when appropriate. These techniques involve such things as appropriately spacing lines and providing alternate perch sites on power poles. Areas of particular concern are within one mile of a river or Milford Lake.

2.4.1.3 Prescription. Protect wintering eagles on Fort Riley from disturbance.

Action. "*Minimum disturbance*" buffer zones are in effect in primary eagle habitat on Fort Riley. Based on the research of Stalmaster and Newman (1978), the buffer zones generally extend 100 m from the normal high-water mark along each riverbank and Milford Lake’s conservation pool shoreline. The zones’ widths generally increase to 200 m along river reaches or lake shoreline with a thin tree border (less than five rows of trees, or 75 m-wide) or no wooded edge (Figure 5). A 200 m minimum flight altitude buffer is established over the protected zones.

Certain exceptions to these general "*minimum disturbance*" buffer zones are established.

(1) Southwest of Camp Forsyth (grid PU 862 260), the 200 m "*minimum disturbance*" buffer zone is adjusted so that it does not extend to the tank trail (Figure 5a).

(2) Southeast of Camp Forsyth (grid PU 891 268), the 200 m "*minimum disturbance*" buffer zone is adjusted to less than 100 m so that it does not extend across McCormick Road (Figure 5b).

(3) South of Main Post (centered on grid PU 915 258), the 200 m "*minimum disturbance*" buffer zone is adjusted to under 100 m so that it does not extend across Stuart Avenue, and does not include Buildings 246, 248 or 252, or the parking lots of these buildings (Figure 5c).

(4) At bridges, the "*minimum disturbance*" buffer zone retains the same width as the zone immediately adjacent to each end of the bridge (Figure 5).

(5) At Marshall Army Airfield, the 200 m "*minimum disturbance*" buffer zone is adjusted to less than 100 m so that it does not contain family housing units and other buildings, or the parking and roadways associated with these buildings (Figure 5d).

(6) South of Camp Funston, the 200 m "*minimum disturbance*" buffer zone is adjusted so that it does not extend across Twelfth Street (Figure 5e).

"*Minimum disturbance*" buffer zones are not a complete sanctuary in which no human activity occurs. Rather, they are areas in which certain activities are controlled to prevent disturbance of bald eagles when eagles are present in the Fort Riley area. All activities including: construction and maintenance, demolition, operation of vehicles, timber harvest, detonation of explosives and recreational pursuits that are proposed to occur within the "*minimum disturbance"* buffer zone between approximately October 15 and March 31 will be reviewed by the DES for potential impacts to bald eagles. Consultation with the USFWS and KDWP is not required if the DES determines that the action is not likely to adversely affect bald eagles. However, vehicle traffic on established, hardened roads and bridges, Army aircraft flight on established arrival and departure routes, and established Army aircraft traffic pattern flight within the protected area are not subject to this requirement

There are three recognized roosting areas on Fort Riley. Two occur along the Kansas River, the third occurs near Madison Creek. The two roosting areas along the Kansas River occur between about October 15 and about March 31. After meeting with the USFWS in 2003, it was determined that the *"No disturbance*" buffer zones for the roosting area along Madison Creek only needed to be in effect from January 15 to March 31. Military training within the Madison Creek roost is excluded from the

provisions outlined below for the *"No disturbance*" buffer zones. *No disturbance*" buffer zones are in effect around communal bald eagle roosts on Fort Riley. The buffers generally extend 100 m in all directions from the roost (Figure 6). All human activities not specifically approved by the USFWS and KDWP are excluded from "*no disturbance*" buffer zones when eagles are in the Fort Riley area. These dates are variable, but generally will occur between about October 15 and about March 31. Two exceptions to these general "*no disturbance*" buffer zones is established:

1. "*No disturbance*" buffer zones are converted to "*minimum disturbance*" buffer zones when the zones encompass existing roadways, buildings, or parking areas (Figure 6a).

2. DES may approve short-term projects within a "no disturbance zone" without consultation with the USFWS and KDWP if the project is of low noise disturbance and occurs after the eagles leave the roost in the morning and before arriving at the roost in the evening.

"*No disturbance*" buffer zones include both woodland areas and improved ground areas (Figure 6a). Improved ground in this sense is defined as being an area that has maintained turf, ornamental landscaping, and oftentimes, associated buildings. Vehicle traffic not specifically approved by the USFWS and KDWP is excluded from the woodland areas within the "*no disturbance*" buffer zones at all times. Vehicle traffic not specifically approved by the USFWS and KDWP is excluded from improved ground areas within the "*no disturbance*" buffer zones while wintering eagles are present in the Fort Riley area. Vehicles may access improved ground areas within these zones when wintering eagles are absent from the Fort Riley area as long as the vehicle does not damage any woody vegetation within 100 m of the roost. Army aircraft flight on established arrival and departure routes, and established Army aircraft traffic pattern flight within the protected area is not subject to this requirement.

Portions of the Union Pacific Railroad's right of way lie within the minimum disturbance buffer areas along the Kansas River and the no disturbance buffer zone established around an existing roost along the Kansas River. Activities of the Union Pacific Railroad on that right of way are not controlled by Fort Riley.

2.4.1.4 Prescription. Protect nesting eagles.

Action. A "*no disturbance*" buffer zone will be established without delay around any active bald eagle nest on lands controlled by Fort Riley. The buffer zone will be large enough to protect the eagles from disturbance. The size of the zone will be determined after conference with the USFWS. All human activity not specifically approved by the USFWS will be excluded from the zone until two weeks after the adults and any young produced there leave the nest vicinity.

Fort Riley cannot impose buffer zones on adjacent lands to protect nesting eagles. However, access through Fort Riley property to adjacent lands on which nesting occurs will be controlled.

2.4.1.5 Prescription. Educate installation's personnel about requirement to protect eagles.

Action. Established Integrated Training Area Management (ITAM) programs are used to disseminate information regarding the ESA and bald eagles to military personnel. For example, senior noncommissioned officers (E-6 – E-8) newly stationed at Fort Riley attend an orientation course (SNCOOC) at which they receive this information.

A brochure describing Threatened and Endangered (T&E) species on Fort Riley is handed out to personnel during the SNCOOC and other training sessions. In addition, training restrictions to protect T&E species are included in Soldiers' and Leaders' Handbooks on the Environment distributed through the ITAM program. Information is provided to aviators through Local NOTAMS (Notices to AirMen) regarding eagle concentrations and behaviors in an attempt to minimize aircraft conflicts with eagles. In addition, DES will provide web-based information on the Fort Riley web page and publish at least one newspaper article per year in the Fort Riley Post regarding eagle use of the area.

Additional programs will be developed, as needed, to publicize the requirements of the ESA to military personnel and others. For example, information boards will be placed at trailheads along riverine walking trails.

2.4.2 Protect and conserve bald eagle habitat on Fort Riley.

The presence of wintering bald eagles on Fort Riley depends primarily on maintenance of riparian woodland habitat that provides the isolation and perches required by the species. Surveys demonstrate that eagles utilize virtually every stretch of the Kansas, Republican, and Smoky Hill rivers' riparian woodland and the tree-lined, Milford Lake shoreline within the installation's boundaries.

2.4.2.1 Prescription. Protect trees important to eagles on Fort Riley.

Action. Trees whose presence is required to maintain the integrity of communal eagle roosts or nest sites on Fort Riley will not be removed or damaged. Further, operation of vehicles off of improved roads and improved grounds within 100 m of an eagle nest tree or communal roost is prohibited unless specifically approved by the USFWS and KDWP.

No trees will be removed from State-designated critical habitat on Fort Riley without prior coordination with the USFWS and KDWP by the DES, Conservation Division except in those areas farther than 100 yards from the Kansas, Republican or Smoky Hill

rivers and 300 yards removed from Milford Lake that are not at a roost or nesting site. Trees whose presence is required to maintain the quality or quantity of eagle habitat on Fort Riley will be replaced to ensure “no net loss” of that habitat. Tree species planted for replacement of those removed will be cottonwood, sycamore and bur oak. All three species grow to be dominant canopy trees selected by bald eagles for perching and roosting sites, and all occur naturally in Kansas’ woodlands. Cottonwood and sycamore grow rapidly in riparian soils, thus providing relatively rapid replacement of lost trees. While bur oak grows much more slowly, it may provide habitat for much longer than the other two species. An exemption to the “no net loss” of habitat is allowed for the Southwest Funston Landfill where continued removal of cottonwood trees is necessary to maintain the evapotranspirative cover.

2.4.2.2 Prescription: Develop a long-term silvicultural plan to manage riparian woodlands for eagle habitat.

Action. A silvicultural plan for promoting a forest structure most useful to bald eagles in the riparian woodlands along the Kansas, Republican and Smoky Hill rivers will be developed. The plan will address long-term management of these stands so that natural succession will not degrade eagle habitat.

Cottonwood trees are preferred eagle perch trees (Steenhof et al. 1980). Eagles' preference for cottonwoods apparently results from the growth form these trees exhibit. They are large trees with stout, open, horizontal branches (Steenhof 1978). Cottonwood trees comprise a significant proportion of the overstory canopy layer along the rivers on Fort Riley. However, cottonwood regeneration is not occurring in these woodlands because cottonwoods are shade intolerant and do not grow beneath a closed canopy. The majority of sapling, pole-sized and mid-canopy trees in these woodlands are hackberry, box elder and American elm. The overall usefulness of these areas to eagles may begin to decline when the large cottonwood and sycamore trees senesce, die and fall over, and preferred trees do not replace them.

The silvicultural plan will describe appropriate management activities that provide a woodland canopy useful to bald eagles. Management activities may include supplemental tree plantings and selective removal of trees. Implementation of this plan will not occur until the USFWS and KDWP have concurred with it.

2.5 MONITORING PLAN

2.5.1 Map riparian timber in the State-designated critical habitat of the bald eagle on Fort Riley.

The riparian timber map will document the following items:

(1) the timber’s width, species composition and distribution, and density.
(2) size of trees.

(3) specific trees or groupings of trees for which there is documented eagle use.
(4) potential nest trees
(5) roost sites.

Mapped information will be incorporated into the installation's Geographic Information Systems (GIS). This information will be consulted when planning actions for the operation and maintenance of the installation and tactical training events during Training Requirements Integration (TRI).

2.5.2 Locate previously unknown roost sites on Fort Riley.

Eagle movements will be monitored at dawn, when eagles are leaving roost sites, and shortly before dusk, when they return to roost sites. Following eagles at these times of the day will allow the best opportunity to discover additional roost sites, if they exist, on Fort Riley.

2.5.3 Search for eagle nesting attempts on Fort Riley.

Aerial and ground-based surveys of the rivers and Milford Lake areas on Fort Riley will be conducted each year after most wintering birds should have left the area but early enough so that leaf cover on trees does not restrict visibility. This period varies from year to year, but usually occurs in late-March or early April. Surveyors will scan riparian timber to look for pairs of eagles and also for nests.

2.5.4 Monitor nesting pairs of bald eagles found on Fort Riley.

All suspected nesting activity would be promptly verified with a ground check. If an active nest is confirmed, it will be monitored weekly to determine the status and outcome of the nesting attempt. Monitoring will be carried out from a vantage point as far from the nest as possible that allows good visibility with optical equipment. Activity of the eagles, including any indications of stick placement, copulation, incubation, or feeding will be documented at each visit.

The USFWS Kansas Field Office will be notified promptly upon the discovery of any suspected nesting bald eagles on Fort Riley.

2.5.5 Monitor wintering eagles on Fort Riley.

Diurnal habitat of bald eagles on Fort Riley will be surveyed weekly when wintering eagles are expected to be present (about October 15 to about March 31). Information recorded will be number and age ratios of eagles at specific locations, weather conditions, snow or ice cover, and time of day.

Roosts will be monitored when bald eagles are in the area. This time is variable from year to year, but generally occurs from about October 15 to about March 31. Monitoring

frequency for each roost will vary. Communal roost surveys will occur at least twice a week. Surveys of the Madison Creek roost will occur weekly. Surveys will start in January and will continue until they indicate that the roost is no longer active. Factors determining frequency of visits to the roosts include time of year and human activities near the roosts.

2.6 ESTIMATE OF TIME, COST, AND PERSONNEL NEEDED

The estimate for accomplishing the required tasks involved in the protection and management of bald eagles on Fort Riley is 59 staff-days. Additional optional tasks will require 5-25 staff-days the first year and 1-10 staff-days annually thereafter. Time involvement of the various goals and actions is provided as follows:

Maintain winter habitat. This will involve annual monitoring of known habitat, mapping additional habitat, conducting briefings or mailings on post to inform appropriate staff of the location and importance of winter habitat, and enforcement of "no net loss" of riparian timber. 15 staff-days annually.

Improve habitat suitability along the Kansas, Republican and Smokey Hill rivers, or 100 yards from the shoreline of Milford Lake, or within 100 m of communal roosts. Requires identifying tree planting sites, and either writing a contract or purchasing, planting, and maintaining trees. 5-25 staff-days the first year of each project, 1-10 staff-days per project thereafter. (These are optional tasks that will be completed if funding and personnel allocations allow)

Minimize injury and mortality. This will require letters and possibly meetings with electric service providers and other facilities maintenance personnel, as well as military training staff. 4 staff-days annually.

Minimize disturbances at habitat sites. Identify, delineate, and enforce buffer zones along riparian areas, including information/education effort on post. 10 staff-days annually.

Winter population surveys. This will require approximately 22 diurnal habitat surveys and 44 roost surveys, coupled with data compilation and analysis. 25 staff-days annually.

Nesting population surveys. This will require one aerial flight survey annually, monitor eagle nest(s), placement of signs, information and education, ground verification. 12 staff-days annually

Develop and distribute hard copy of eagle habitat map. This will require distributing a GIS-based data layer depicting eagle habitat locations. 3 staff days.

2.7 CHECKLIST OF TASKS

2.7.1 Protect bald eagles on Fort Riley from human-induced injury and mortality.

It has been determined that approximately half of all bald eagle mortalities in Kansas result from electrocutions directly attributable to power lines or flying eagles striking either a power line or tower. Techniques are available to mark or otherwise design such structures so that these hazards are greatly reduced.

Any projects to construct new or modify existing aerial structures on Fort Riley will be reviewed by DES, Conservation Division prior to project implementation for need to incorporate line markers. section 2.4.1.1

Any projects to construct new or modify existing electric transmission lines on Fort Riley will be reviewed by DES, Conservation Division prior to project implementation for need to incorporate construction guidelines specified to protect eagles against electrocution (Olendorff et al. 1981). section 2.4.1.2

Isolation and protection from human disturbance is a factor that appears important in protecting bald eagles throughout their range. Surveys demonstrate that eagles use virtually every stretch of the rivers adjacent to Fort Riley and the shoreline of Milford Lake. These areas will be protected so that eagles will continue to be able to meet their biological needs while eagles are present.

"*Minimum disturbance*" buffer zones are established along each river and Milford Lake shoreline on Fort Riley. The zones' widths are generally 100 m when a wide tree border occurs, and generally increase to 200 m along river reaches or Milford Lake shoreline with a thin tree border or no wooded edge. Exceptions to these general rules occur. The zones are areas in which the following activities are controlled when eagles are in the Fort Riley area: construction, demolition, operation of vehicles, timber harvest, detonation of explosives and recreational pursuits. section 2.4.1.3

A 200-m minimum flight altitude buffer is established over the "*minimum disturbance*" buffer zones. section 2.4.1.3

"No disturbance" buffer zones are established around communal bald eagle roosts. The buffers generally will extend 100 m in all directions from the roost. All human activities not specifically approved by the USFWS or DES under the provisions in 2.4.1.3 are excluded from these zones when eagles are in the Fort Riley area. Vehicle traffic not specifically approved by the USFWS and KDWP is excluded from the woodland areas within the buffer zones at all times. Vehicle traffic not specifically approved by the USFWS and KDWP is excluded from improved ground areas within the buffer zones while wintering eagles are present in the Fort Riley area. Army aircraft flight on established arrival and departure routes, and established Army aircraft traffic pattern flight are not included in these restrictions. section 2.4.1.3

In 2003 there were 18 active bald eagle nests in Kansas, of which 15 were successful in fledging young. A record high of 32 eagles fledged from these nests. The nesting population is anticipated to continue to increase in Kansas, with Milford Lake and the Kansas, Smoky Hill and Republican rivers believed likely areas for new nests.

A "*no disturbance*" buffer zone large enough to protect the eagles from disturbance will be established without delay around any active nest that is confirmed to exist by the DES, Conservation Division. All human activity not specifically approved by the USFWS will be excluded from the zone until two weeks after the adults and any young produced there leave the nest vicinity. section 2.4.1.4

Develop information/education materials and other programs, as needed, to disseminate information regarding “minimum disturbance” and “no disturbance” buffer zones to installation personnel. section 2.4.1.5

2.7.2 Protect and conserve bald eagle wintering habitat on Fort Riley.

The bald eagle surveys demonstrate that eagles utilize virtually every stretch of the wooded riverbanks and Milford Lake shorelines within the installation’s boundaries. Protecting these areas is critical to ensure that eagles will be able to continue to meet their biological needs while they are on Fort Riley.

Trees required to maintain the integrity of communal eagle roosts or nest sites on Fort Riley will not be removed or damaged. Further, operation of vehicles off of improved roads and improved grounds within 100 m of an eagle nest tree or communal roost is prohibited unless specifically approved by the USFWS and KDWP. section 2.4.2.1

No trees will be removed from within State-designated critical habitat of the bald eagle on Fort Riley that is within 100 yards of the Kansas, Republican or Smoky Hill rivers, or within 300 yards of Milford Lake shorelines, or that are an integral component of nest or roost sites, without prior coordination with the USFWS and KDWP by the DES, Conservation Division. section 2.4.2.1

Ensure “no net loss” of eagle habitat within the State-designated critical habitat on Fort Riley. Trees removed within this area that diminish the quality and/or quantity of eagle habitat will be replaced. Eagle trees that are removed will be replaced. Species planted to replace those removed will be cottonwood, sycamore and bur oak. section 2.4.2.1

Develop a silvicultural plan to promote growth of a forest structure most useful to bald eagles in the riparian woodlands along the Kansas, Republican and Smoky Hill rivers. section 2.4.2.2

2.7.3 Monitor bald eagles and their habitat on Fort Riley.

_____Bald eagles are known to occur in large numbers on Fort Riley throughout the winter months. Long-term monitoring of eagles on Fort Riley will allow management efforts to maintain high use areas, or possibly improve low use areas. The Kansas nesting population is expected to increase. Areas around Milford Lake and the Kansas, Smoky Hill and Republican rivers are believed likely areas for new nests.

_____Map riparian timber in the State-designated critical habitat of the bald eagle on Fort Riley. The map will include the timber's width, species composition and distribution, and density; size of trees; specific trees for which there is documented eagle use; potential nest trees; and roost sites. section 2.5.1

_____Incorporate riparian timber map, "*no disturbance*" and "*minimum disturbance*" buffer zones, and State-designated critical habitat into the installation's GIS databases. section 2.5.1

_____Consult the GIS map when planning actions for the operation and maintenance of the installation and tactical training events during TRI. section 2.5.1

_____Search for previously unknown roost sites on Fort Riley. Following eagle movements at dawn or before dusk most easily discovers roosts. section 2.5.2

_____An aerial search of riparian woodlands for nesting bald eagles will occur annually in late March or early April. section 2.5.3

_____Suspected nesting activity would be verified within 3 days. Any active eagle nest will be monitored weekly to determine the status and outcome of the nesting attempt. section 2.5.4

_____The USFWS Field Office will be notified without delay of the discovery of an active nest on Fort Riley. section 2.5.4

_____Survey bald eagle use of diurnal habitat weekly when wintering eagles are expected to be present on Fort Riley (about October 15 to about March 31). section 2.5.5

_____Monitor roosts when bald eagles are in the area. Monitoring frequency for each roost will vary. Communal roost surveys will occur twice a week. section 2.5.5

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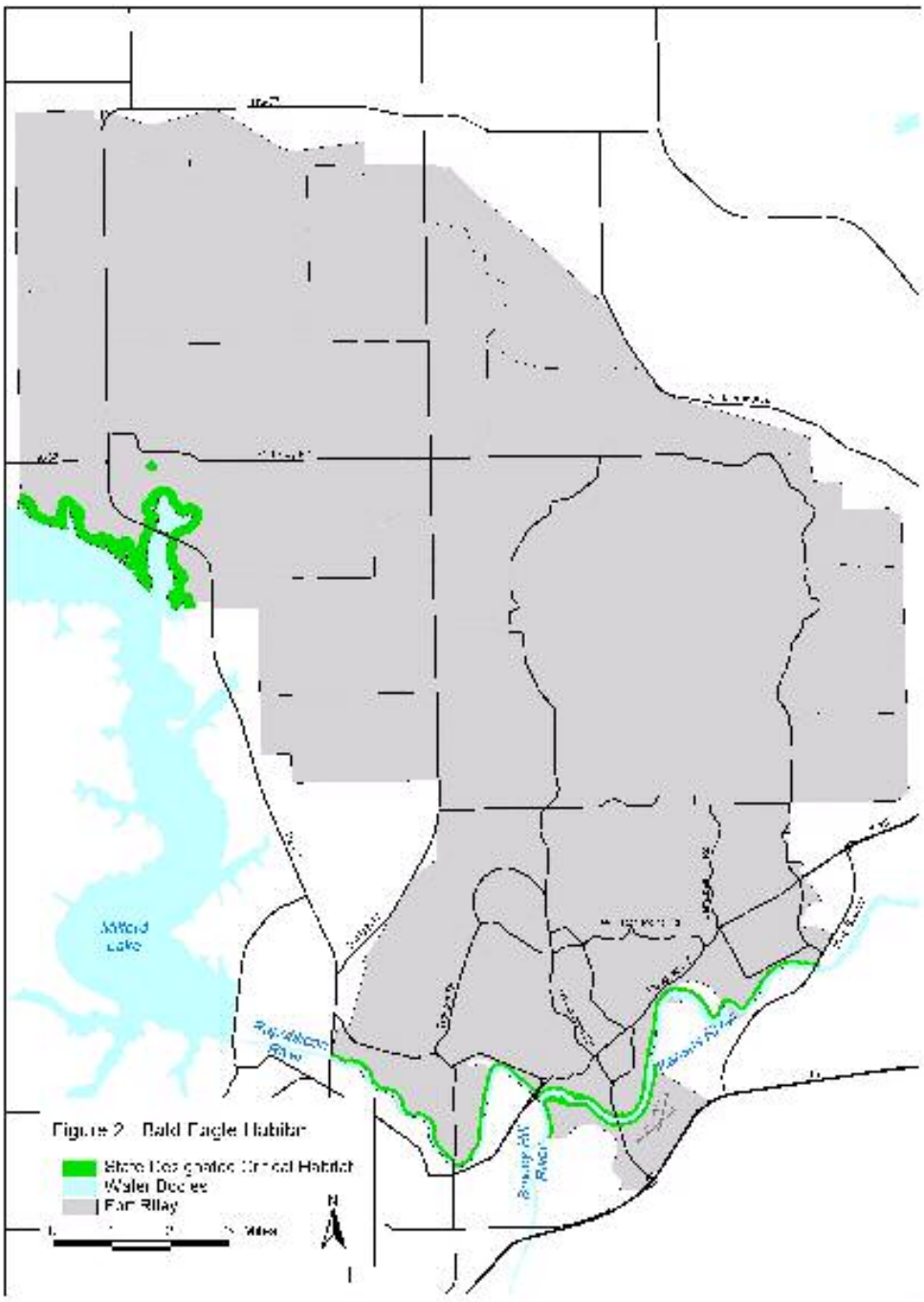

Milford Lake
Figure 2 Bald Eagle Habitat
Water Bodies
Fort Riley
N

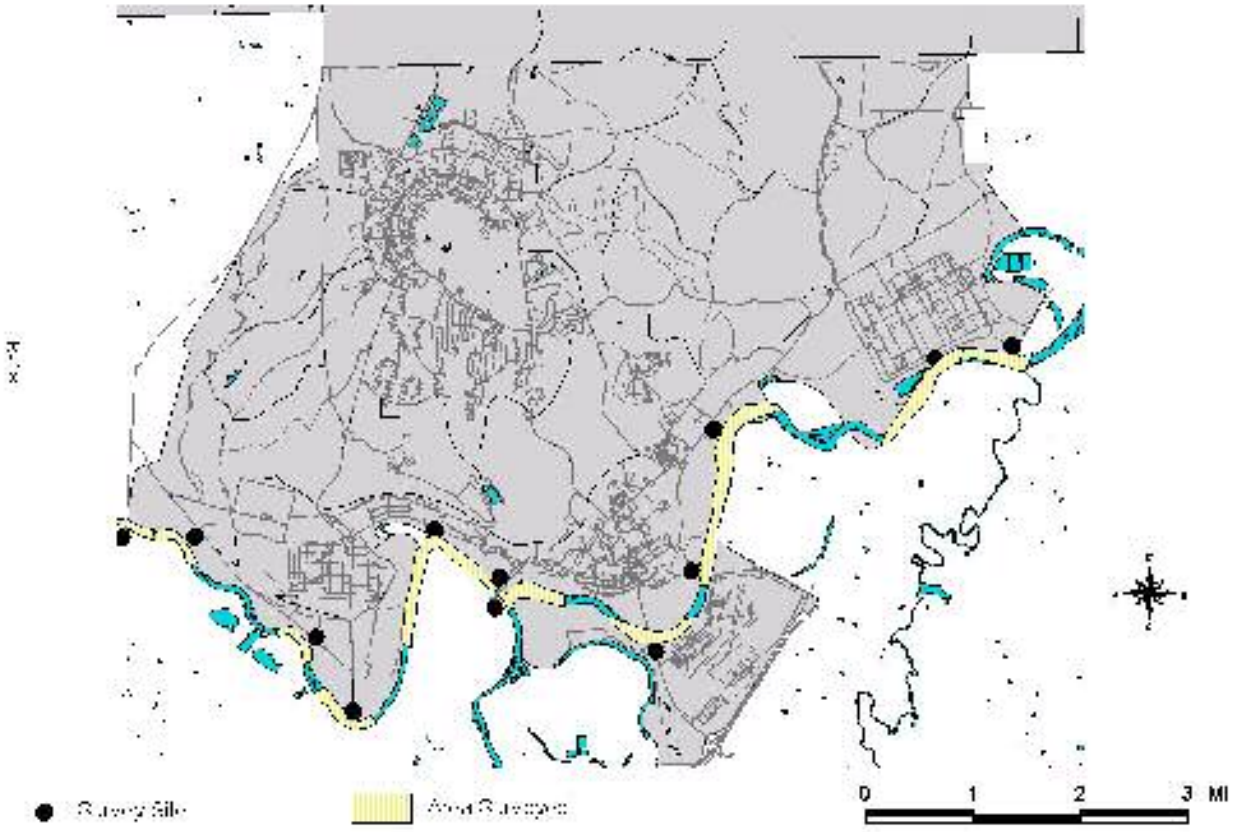
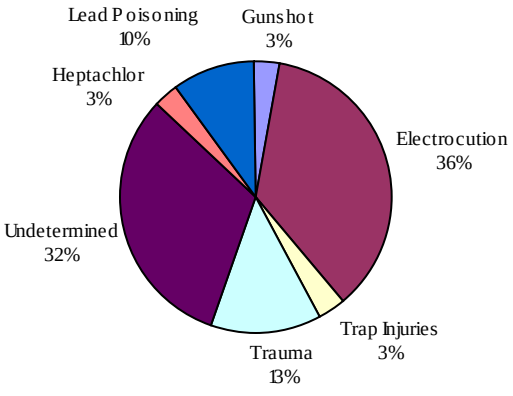
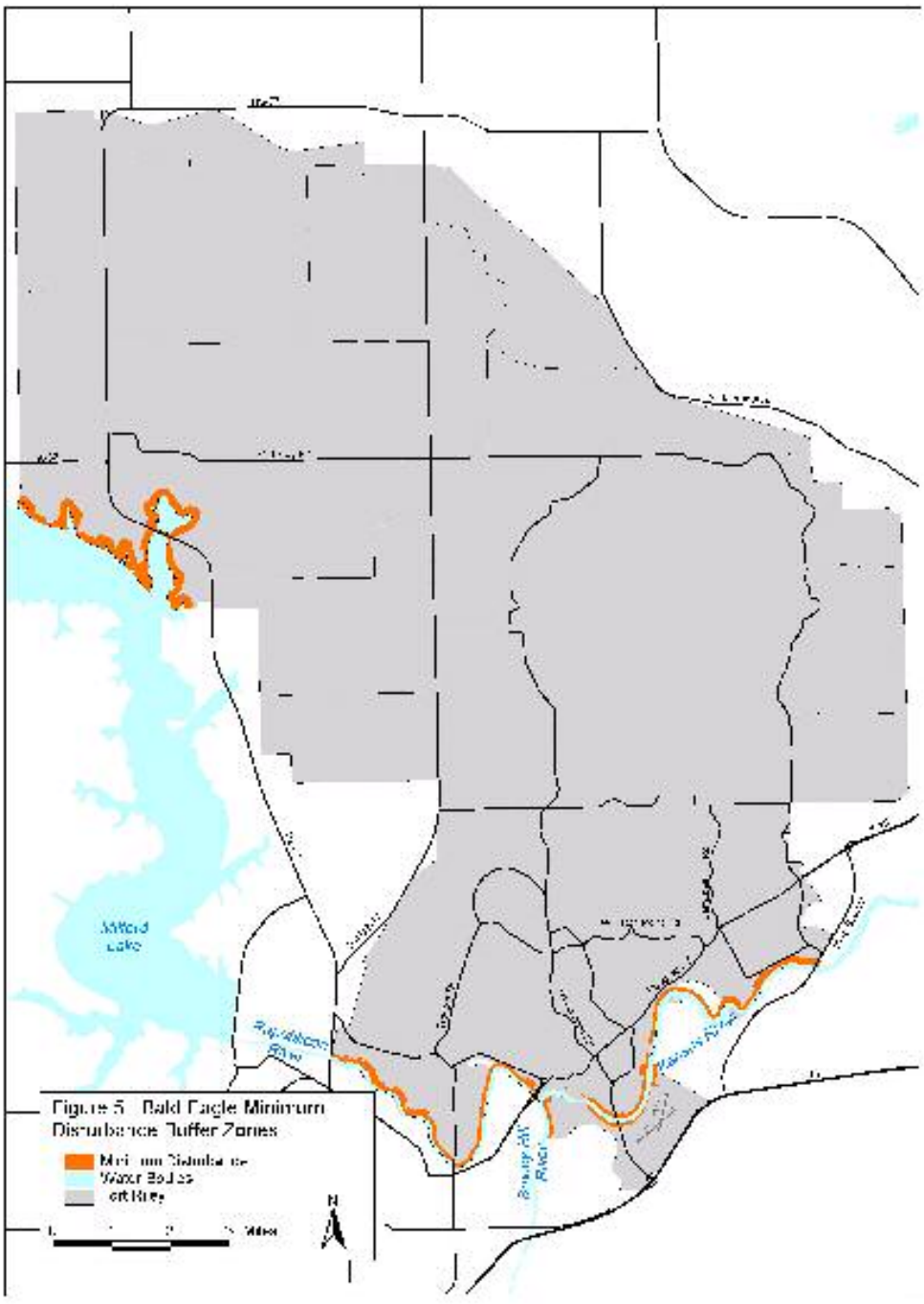
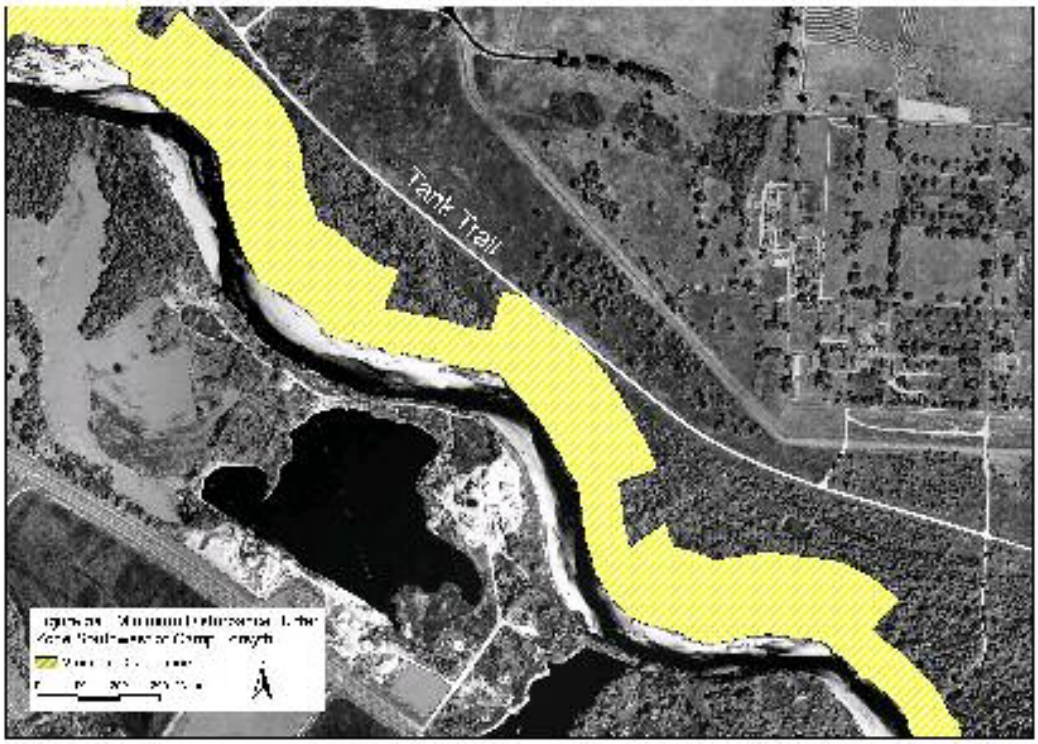


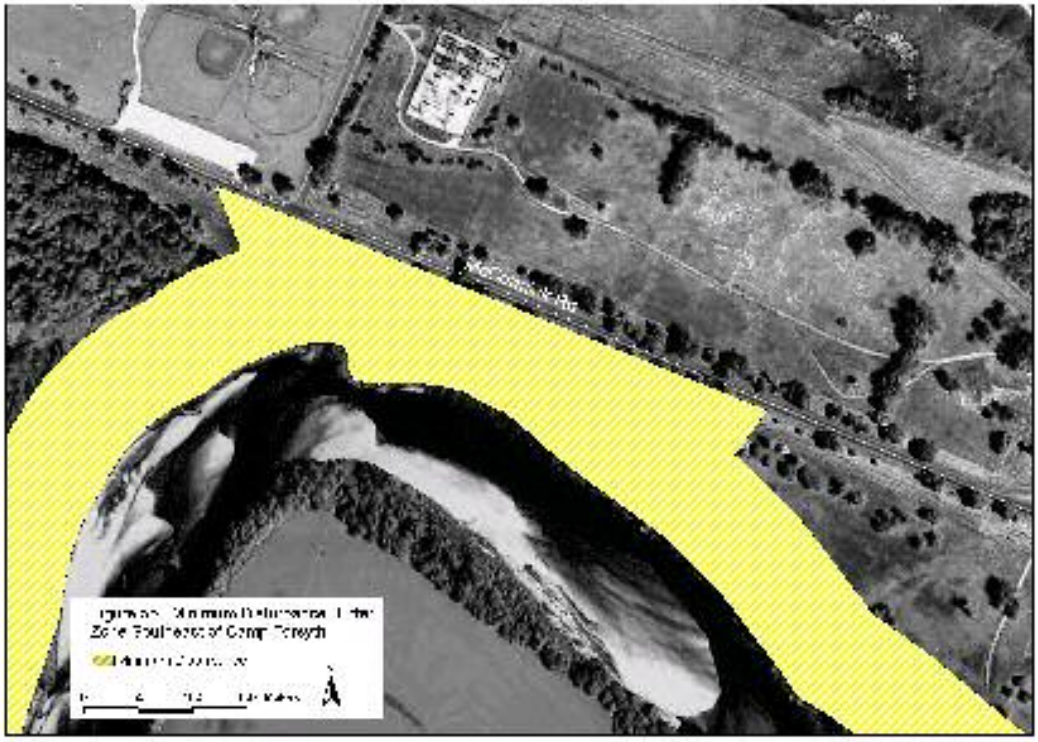
Figure 3. [illegible] for each site. Each site is visited during each weekly eagle survey conducted between October 1 and March 31.

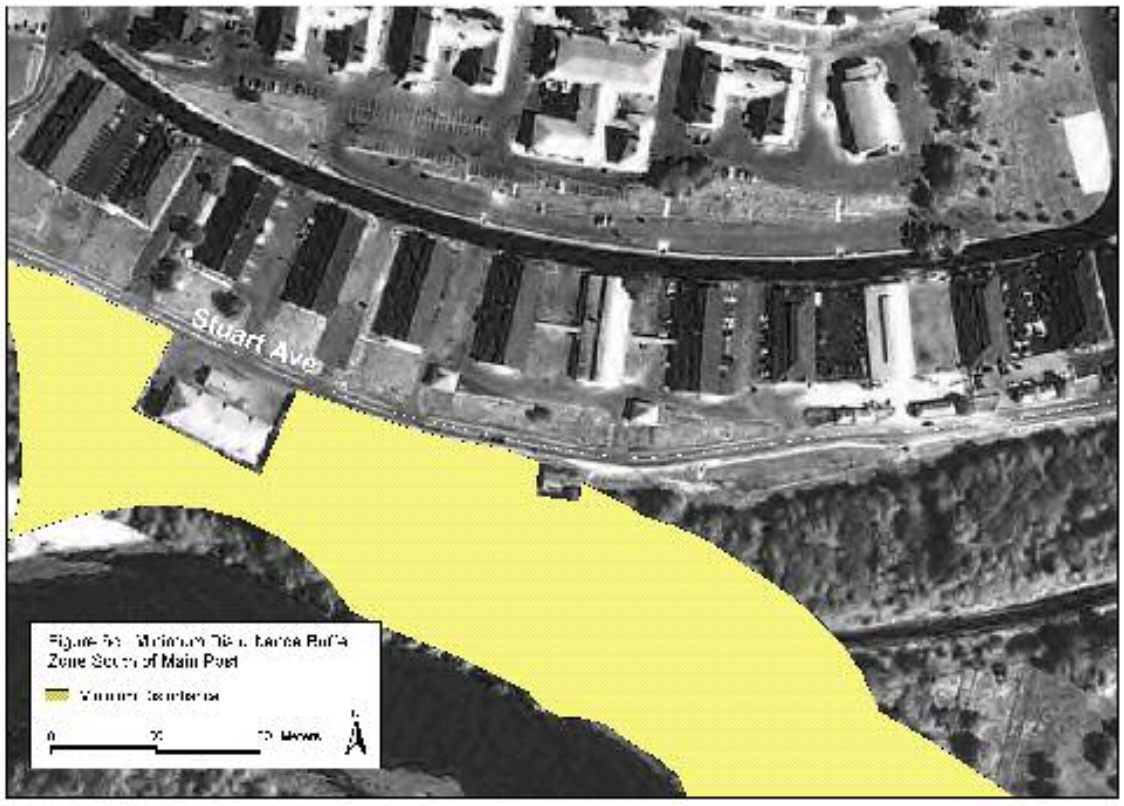
Figure 4. Causes of bald eagle mortality in Kansas during the years 1979-89.




Milford Lake
Figure 5 Bald Eagle Minimum Disturbance Buffer Zones
N


Tank Trail




Stuart Ave

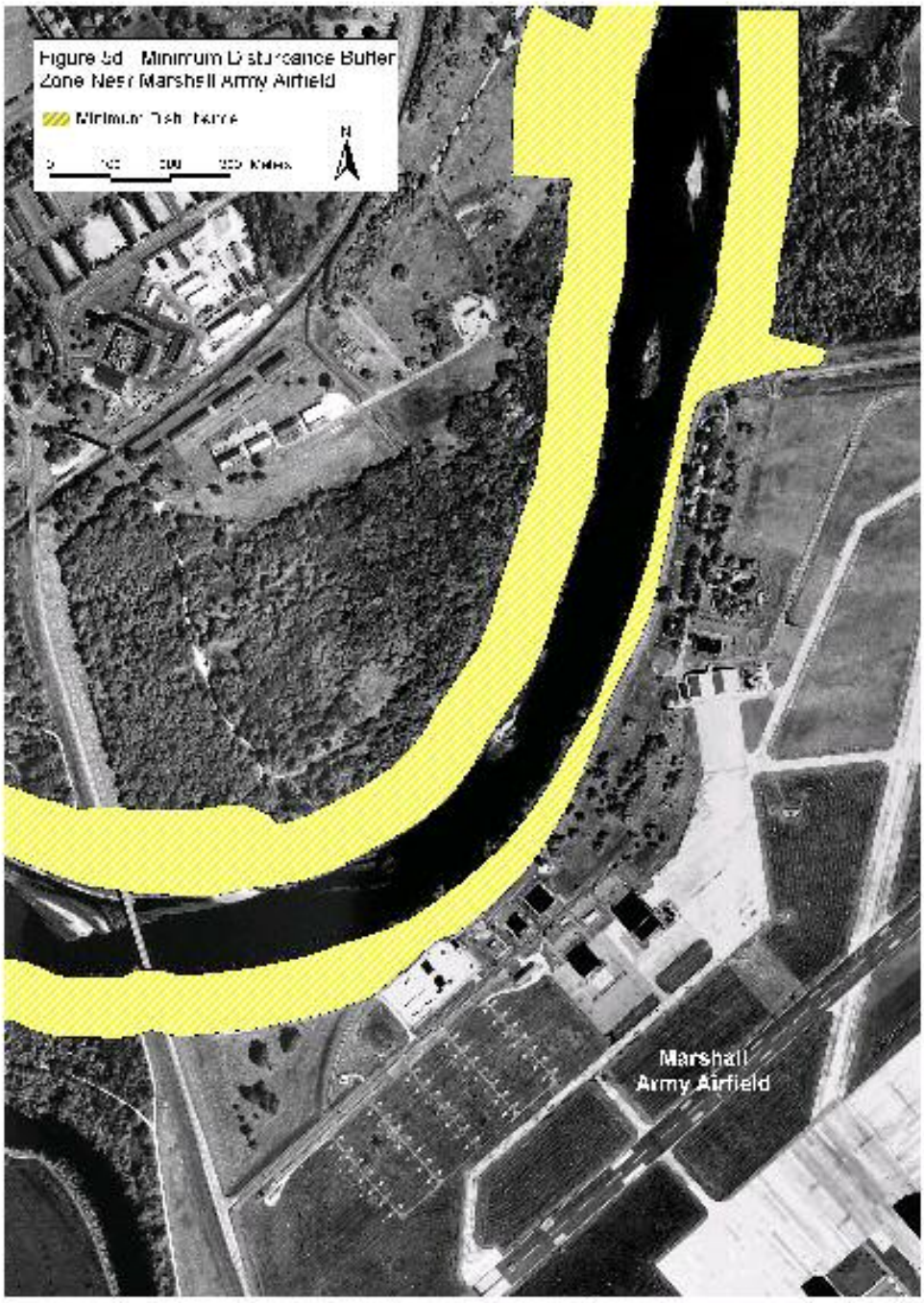
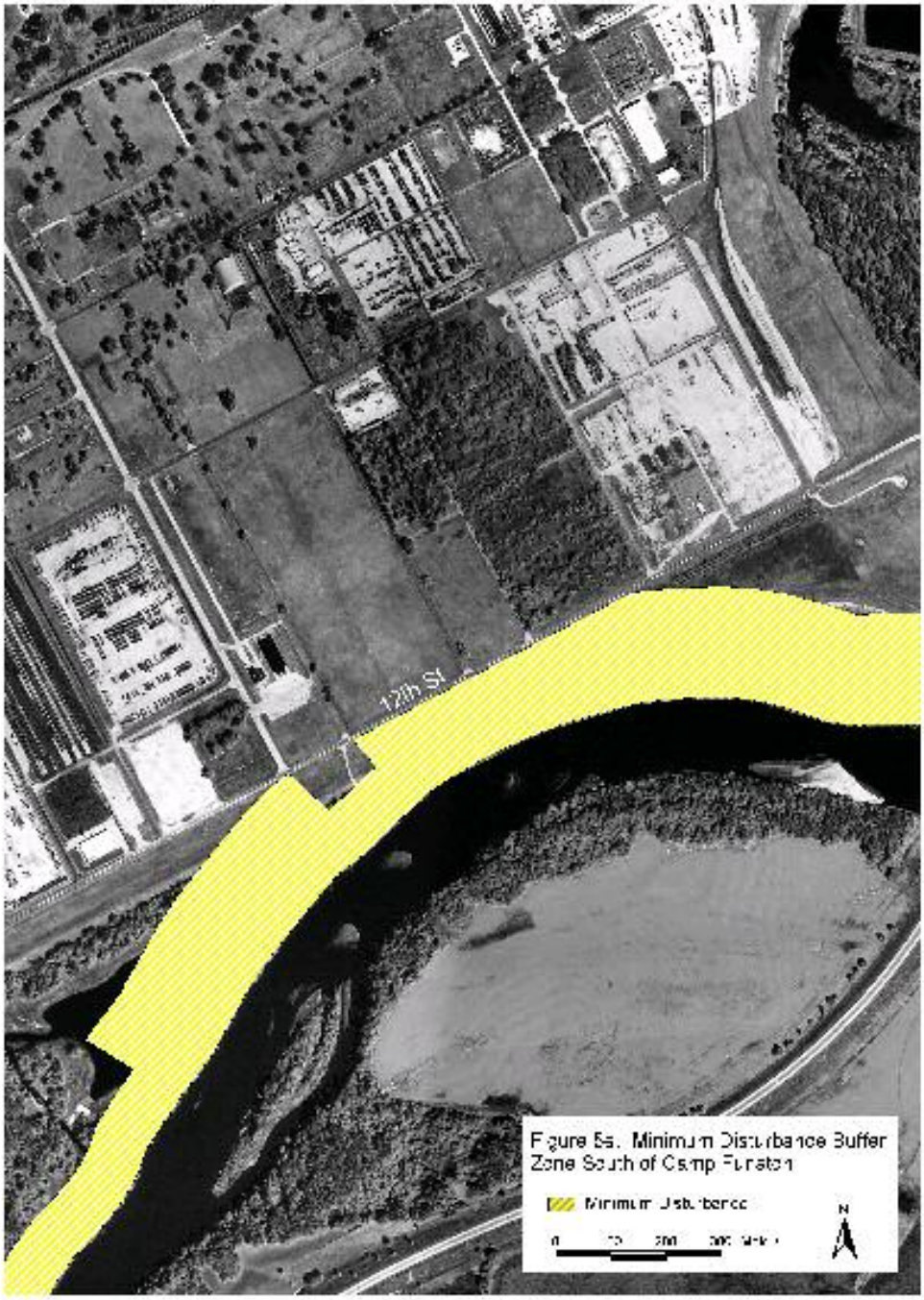
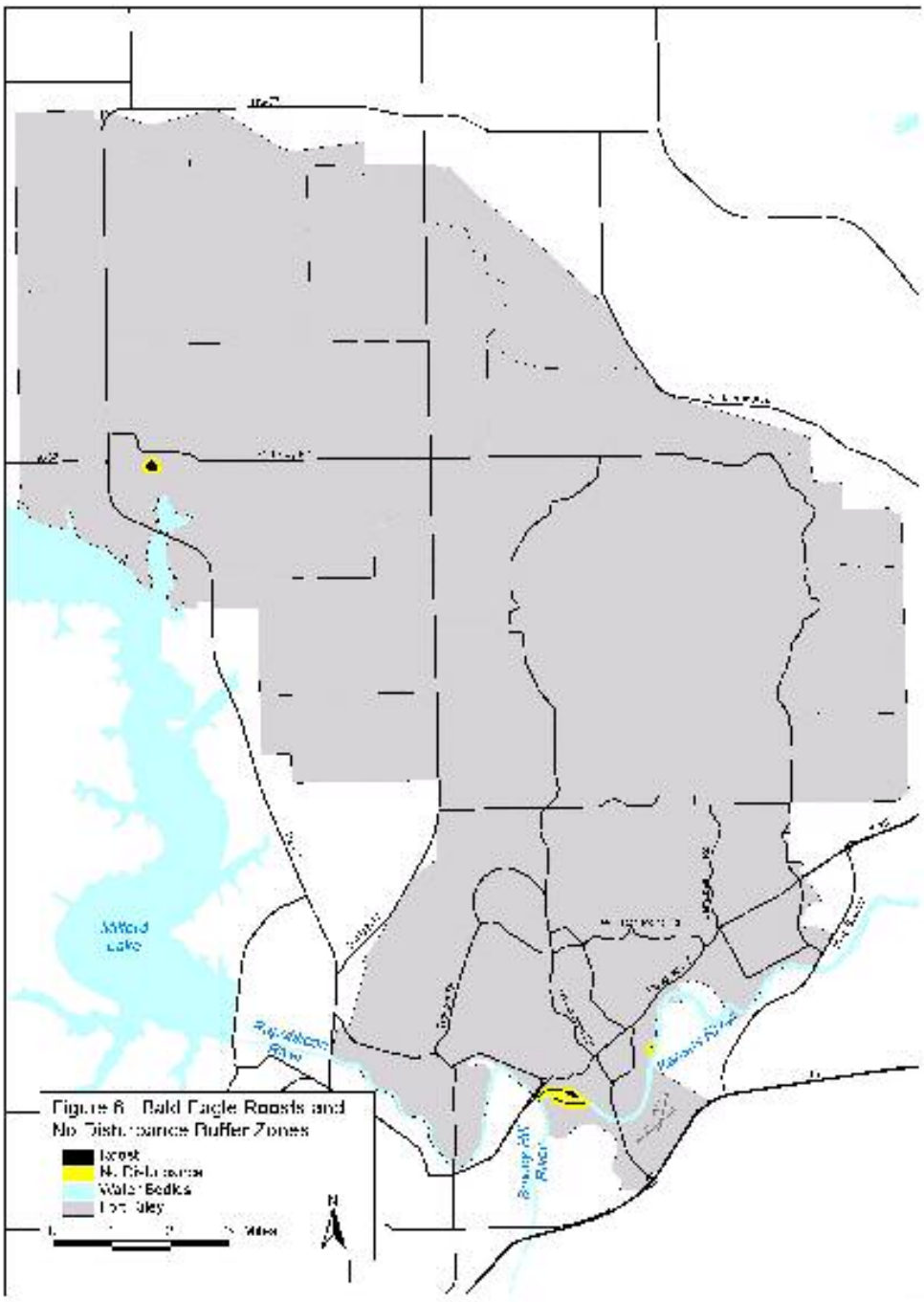
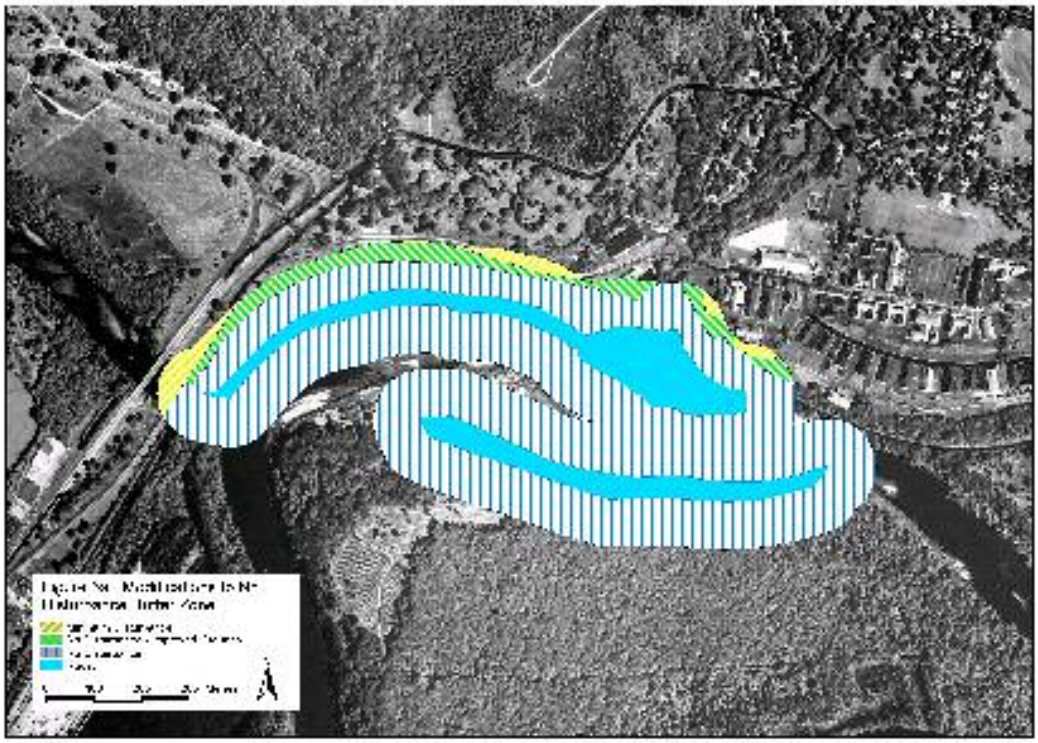


Figure 5d Minimum Disturbance Buffer
Zone Near Marshall Army Airfield
N
Marshall
Army Airfield


12th St
Figure 8a. Minimum Disturbance Buffer
Zone South of Camp Funston
Minimum Disturbance
N


Milford Lake
Figure 6 Bald Eagle Roosts and
No Disturbance Buffer Zones
Forest
Water Bodies
N



NEST LOCATION	NUMBER OF EAGLETS FLEDGED EACH YEAR															
	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	TOTAL
Clinton Reservoir #1	2	3	3	3	3	3	2	3	3	3	1	3	1	2	3	38
Hodgeman County	?	1	2	2	2	3	na	na	na	na	na	na	?	1	2	13
Hillsdale Reservoir #1					1	2	2	2	2	2	2	2	2	2	2	21
Wolf Creek Cooling Lake						2	1	2	3	2	2	0	0	0	na	12
Perry Reservoir #1						2	0	2	3	2	1	1	1	1	3	16
N. Fork Ninnescah River							0	0	2	0	na	na	na	na	na	2
Norton Reservoir									2	2	3	3	1	na	na	11
KS R #1 - Williamstown									1	0	2	2	2	1	2	10
Hillsdale Reservoir #2											0	2	2	2	2	8
Clinton Reservoir #2												3	2	1	3	9
Glen Elder Reservoir												1	1	2	1	5
Pomona Reservoir												2	3	3	3	11
KS R #2 - Lecompton													1	na	2	3
Neosho County													2	1	2	5
Tuttle Creek Reservoir														2	2	4
KS R #3 - Tecumseh														1	1	2
Clinton Reservoir #3															2	2
Perry Reservoir #2															2	2
KS R #4 - Lawrence															0	0
KS R #5 - Valencia	*na = no known nesting attempt*														0	0
Perry Reservoir #3	*0 = nesting attempt failed to fledge young*														0	0
TOTAL	2	4	5	5	6	12	5	9	16	11	11	19	18	19	32	174

SECTION 4.0 LEAST TERN AND PIPING PLOVER MANAGEMENT PLAN

Executive Summary

Current Species Status: The interior least tern is federally listed and Kansas-listed as endangered. The Northern Great Plains piping plover is federally listed and Kansas-listed as threatened. Both species occur on Fort Riley as rare transients and use the installation as a migration area. The nearest location to Fort Riley with documented breeding of least tern and piping plover is a Kansas River sandbar in Pottawatomie County.

Habitat Requirements and Limiting Factors: Least terns and piping plovers use similar habitats. These generally consist of unvegetated sandbars and islands in wide, river channels. Unvegetated shorelines are also used. Large, barren sandbars are preferred over smaller sandbars. Primary least tern and piping plover habitat on Fort Riley exists along the Kansas and Republican rivers. Threats to these species on Fort Riley include habitat destruction, human disturbance and birds flying into physical structures.

Management Objectives: Protect least terns and piping plovers, and their habitat, on Fort Riley.

Conservation Goals: The conservation goals are to protect individual least terns and piping plovers from "takings" while they are present within the installation's boundaries, and to maintain existing habitat on Fort Riley.

Only transient individuals have been observed on Fort Riley to date. Consequently, this management plan does not establish specific population goals for either the least tern or piping plover.

Sandbar habitat on Fort Riley is substantially affected by water releases from Milford Lake, which are controlled by the Corps of Engineers. The abundance and distribution of sandbar habitat is not under the control of Fort Riley. Consequently, Fort Riley's ability to manage or manipulate sandbar habitat is limited. Fort Riley's primary options for managing habitat are to control human disturbance and physical impacts to sandbars that are unrelated to water levels.

Actions Needed: Fort Riley will: (1) Protect all least terns and piping plovers on Fort Riley; (2) Protect and conserve least tern and piping plover habitat; and (3) Monitor least tern and piping plover use of Fort Riley.

Specifically, Fort Riley will: (a) Review all new, replacement or modified aerial transmission line projects for the need to incorporate "avian-friendly" features; (b) Protect existing least tern and piping plover habitat from human disturbance; (c) Map existing least tern and piping plover habitat; and (d) Perform annual surveys to document least tern and piping plover use of Fort Riley.

Total Estimated Cost of Conservation Actions: It is estimated that accomplishing the tasks involved in least tern and piping plover management on Fort Riley will require 25

staff-days annually. Another 10 staff-days will be required if nesting is confirmed on Fort Riley. The primary cost involves staff salary.

LEAST TERN AND PIPING PLOVER MANAGEMENT PLAN

3.1 INTRODUCTION

The purposes of this Endangered Species Management Plan (ESMP) are: (1) to present information on the least tern (*Sterna antillarum*), a species federally listed and Kansas-listed as endangered, and the piping plover (*Charadrius melodus*), a species federally listed and Kansas-listed as threatened, both of which have occurred during migration on Fort Riley, Kansas (Fort Riley); (2) to discuss the protection of these species on Fort Riley; (3) to define conservation goals; and (4) to outline a plan for management of these species and their habitat that will enable achievement of conservation goals. These purposes are consistent with the management recommendations that were provided to Fort Riley by the U.S. Fish & Wildlife Service (USFWS) in 1995.

Some of the activities described in this report involve manipulating areas below the normal high water mark of the Kansas and Republican rivers. These rivers' flows on Fort Riley are influenced by the U.S. Army Corps of Engineers (COE) through their water release from Milford Lake. Consequently, habitat manipulations of riverine sandbars and beaches are limited by the COE water releases.

This ESMP is based on and is consistent with the Endangered Species Act of 1973 (ESA), the Kansas Endangered Species and Nongame Conservation Act of 1975, and Army Regulations (AR 200-3). This plan does not supersede ESA Section 7 consultation requirements with the USFWS or replace the need to obtain special permits from the Kansas Department of Wildlife & Parks (KDWP). Any action that may directly or indirectly affect the piping plover or least tern, or their preferred habitat, must be coordinated with the USFWS and KDWP by the Fort Riley Directorate of Environment and Safety, Conservation Division.

3.2 SPECIES INFORMATION.

3.2.1 Description. Least Tern. The least tern is the smallest North American tern. Its body length is 8-10 inches. Least terns have a black-capped crown with a white forehead patch and a black-tipped, orange or yellow bill during the breeding season. They lose their black cap in fall and winter, and their bills become dark. Throughout the year, least terns display a black border along their pointed wing tips, a forked tail, and a small body. Male birds have orange legs and females have yellow legs. Least terns are most easily confused with Forster's terns (*Sterna forsteri*) and seagulls (*Larus spp*.).

Forster's terns are identified by their white wing tips and solid black cap. Seagulls lack a forked tail.

Piping Plover. The piping plover is a tiny shorebird. Its body length is 6-7 inches. Piping plovers have a back the color of dry sand. They have a white rump, breast, and belly. Breeding adults possess a black forehead patch, orange legs, a short, black-tipped, orange bill, and a black breast band, which may be complete or incomplete. Winter birds and juveniles are duller in color and lack the conspicuous black markings. Piping plovers may be confused with snowy plovers (*Charadrius alexandrinus*), semi-palmated plovers (*Charadrius semipalmatus*), and killdeer (*Charadrius vociferus*). Snowy plovers are identified by their black bill, black legs and black ear patch. Semi-palmated plovers have a brown, not sandy-colored back, and have a single, complete breast band. Killdeer are larger and have two conspicuous, black breast bands throughout the year.

3.2.2 Habitat/Ecology. The piping plover and least tern are breeding associates (Dryer and Dryer 1985, Faanes 1983). Nesting habitat for the two species is usually unvegetated sandbars or islands that provide good visibility in wide, riverine channels (Sidle and Harrison 1989; Whyte 1985). Vegetation should not exceed 25% of the ground cover for optimal use. When vegetation growth exceeds this threshold limit, least terns and piping plovers will stop nesting on the site (Faanes 1983). Other unvegetated, exposed shorelines also may be used for nesting. However, large sandbars are preferred over narrow strips of shoreline or beach.

Both species' nests are shallow and inconspicuous depressions in an open, sandy area or gravely patch. Small stones, twigs and pieces of debris lie near the nest (Sidle and Harrison 1989; Whyte 1985). Least terns nest in colonies. Piping plovers nest as solitary pairs.

Both least terns and piping plovers use areas similar to their breeding habitats during migration. Least terns feed on small fish and will sometimes dive from great heights in pursuit of these (Sidle and Harrison 1989). Piping plovers feed on exposed sandbars, foraging for aquatic invertebrates at or near the surface of the sand (Whyte 1985).

3.2.3 Distribution. Least Tern. Three subspecies of least tern occur in North America; the endangered interior least tern, the threatened eastern or coastal least tern, and the endangered California least tern. The subspecies are differentiated primarily by the location of their breeding habitats. Interior least terns breed at inland freshwater locations. The other two subspecies breed along the Atlantic and Pacific Ocean coasts (Sidle and Harrison 1989).

All least tern subspecies are migratory. The interior least tern winters from the Gulf of Mexico south to the northern coast of South America. Its historic breeding range extended from Texas to Montana and from New Mexico to Indiana. This included the Red, Platte, Missouri, Arkansas, Mississippi, Ohio and Rio Grande river systems.

Interior least terns still nest throughout their historic breeding range. Census data indicate an interior least tern population of approximately 5,000 birds (USFWS 1990).

Interior least terns nest in Kansas along the Cimarron River in Meade, Comanche and Clark counties, at Quivira National Wildlife Refuge, at Cheyenne Bottoms Wildlife Management Area (Boyd 1987; Schulenberg and Ptacek 1984), and along the Kansas River. The Kansas River terneries have been established since the 1993 flooding. These include a colony discovered in 1994 at Jeffrey Energy Center in Pottawatomie County, and two colonies discovered in 1996 on Kansas River sandbars (USFWS pers. comm.). Least terns also occur as uncommon transients throughout Kansas. Most least tern sightings occur between April 30 and September 7 (Thompson and Ely 1988).

Piping Plover. Three subspecies of piping plover occur in North America: the threatened Northern Great Plains piping plover, the endangered Great Lakes piping plover, and the threatened Atlantic Coast piping plover. The subspecies are differentiated primarily by the location of their breeding habitats (Haig et al. 1988).

All piping plover subspecies are migratory. They winter along the Gulf of Mexico coastline from Florida to Mexico. Northern Great Plains piping plovers historically bred along the Missouri River System, extending from Alberta and Manitoba, Canada, south to Nebraska, and from Montana to Iowa (Haig et al. 1988). This subspecies' range may have recently expanded, as breeding is documented in eastern Colorado and northern Oklahoma (Boyd 1991). Otherwise, its range remains similar to historic accounts. Census data indicate a Northern Great Plains piping plover population of approximately 3,500 birds (Haig and Plissner 1993).

The first confirmed piping plover nest in Kansas was found in 1996 on a Kansas River sandbar that also had breeding least terns present (USFWS pers. comm.). The piping plover is typically a rare transient throughout Kansas, with spring records between March 21 and May 21 and fall records between July 7 and September 12 (Thompson and Ely 1988).

The USFWS evaluated Fort Riley for least tern and piping plover habitat in 1990. A few areas along the Kansas River were found to contain high quality habitat for these species (USFWS 1992). The high water flows that occurred in 1993 and 1995 improved the habitat in other locations within the Kansas and Republican rivers (Figure 8). Sandbars and islands shifted locations and were scoured clean of vegetation. KDWP designated in 2000 critical habitat for least terns and piping plovers to include all the waters within a corridor along the main stem of the Kansas River. This includes those sections of the river that occur on or adjacent to Fort Riley.

Surveys to locate least terns and piping plovers on Fort Riley were initiated in 1994. Survey sites provide a view of the sandbar and beach habitats occurring on the installation (Figure 9). Approximately 40% of Milford Lake's shoreline, 90% of sandbar and beach habitat along the Republican River and 60% of beach and sandbar habitat

along the Kansas River is viewed during each survey. Surveys are performed every 7-10 days[1] between March 21 - May 31, and July 7 - September 15.

DES, Conservation Division personnel observed two piping plovers on Fort Riley in April, 1996, and one in September, 1996 during these surveys. The piping plovers were observed on sandy beaches of both the Kansas and Republican rivers. Two least terns were observed along the Kansas River in May, 1996, and one in May, 1997. A least tern was observed in the former Military Marina area of Milford Lake in May, 2001. The birds were not seen on subsequent trips to the site.

3.2.4 Reasons for Listing. River channelization, irrigation, and the construction of mainstem dams have eliminated much of the sandbar-nesting habitat used by these species throughout their range (Haig et al. 1988). These practices remove sandbars from river systems and degrade the sandbars that remain. Regulating river flow for navigation eliminates the scouring action of high water flow that removes vegetation from sandbars. The ensuing vegetation encroachment results in poor to no habitat on the remaining sandbars. Other factors interact to reduce least tern and piping plover numbers. For example, increased urbanization and human recreational use of nesting areas reduce reproductive success and increase predatory pressure on these species (Haig et al. 1988).

The interior least tern and Northern Great Plains piping plover were listed under the ESA due to their falling numbers, the vast transformation and loss of riverine habitat throughout their nesting range, and the belief that these conditions would continue or worsen into the future. The interior least tern was listed as endangered in 1985 (50 Federal Register 21784). The Northern Great Plains piping plover was listed as threatened in 1986 (50 Federal Register 50726).

3.2.5 Conservation Measures. The USFWS and COE are discussing altering operation of mainstem dams along the Missouri River to benefit interior least terns and Northern Great Plains piping plovers. Most state efforts center around surveying for nesting habitat of these species, protecting that habitat found, and attempting to reduce the predatory rate experienced at nest sites. The Platte River Whooping Crane Trust is trying to rehabilitate sandbars in the central Platte River.

3.3 CONSERVATION GOALS

3.3.1 Protect individual least terns and piping plovers while they are present on Fort Riley.

3.3.2 Maintain existing abundance and quality of least tern and piping plover habitat on Fort Riley.

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1 7-10 days is the frequency for conducting shorebird surveys suggested by the U.S. Shorebird Conservation Plan's Monitoring Program, based on the assumption that shorebirds within an area tend to turn over in this length of time.

3.4 MANAGEMENT PRESCRIPTIONS AND ACTIONS

3.4.1 Protect individual least terns and piping plovers from human-induced injury.

A hazard to least terns and piping plovers is the presence of chemical contaminants in the fish and invertebrates upon which these species feed. Protection from contaminants is best achieved by maintaining a chemical-free aquatic environment in which they may feed. Fort Riley's compliance with the Clean Water Act, the Federal Insecticide, Fungicide and Rodenticide Act, DoD Directives and Army Regulations 200-5 protect against chemical contamination. These laws and regulations provide sufficient protection for these species on Fort Riley. Consequently, this plan will not place further restrictions on the use of pesticides or other chemicals.

The presence of unmarked power lines, towers and other structures into which least terns and piping plovers may fly is hazardous. Many transmission lines, poles, and towers exist on Fort Riley. All may pose some degree of threat to these species. However, techniques are available to mark such structures to eliminate or greatly reduce the hazard.

Human disturbance at nesting areas may have several negative effects. Human presence may inhibit courtship, incubation and brooding behaviors. People and vehicles can trample nests and destroy young (Evans 1985). Unleashed pets may prey upon adults, young and eggs (Haig et al. 1988).

3.4.1.1 Prescription. Minimize the risk of least tern or piping plover collisions with aerial structures.

Action. Techniques are available to mark or otherwise design aerial structures so that the striking hazard is eliminated or greatly reduced. Line markers, such as aviation balls and colored spiral dampers, and similar markers for towers and guy lines may be used to make these structures more visible to least terns and piping plovers. Any projects to construct new or modify existing aerial structures on Fort Riley will be reviewed by DES, Conservation Division at least 30 days prior to project implementation to determine whether line markers are needed. Areas of particular concern are within one mile of a river or Milford Lake shoreline because these may be used as travel lanes. Many of these structures may be the responsibility of public utility companies rather than Fort Riley. Fort Riley, however, maintains authority over construction within its property boundaries.

3.4.1.2 Prescription. Protect least terns and piping plovers on nesting territories.

Action. A "*no disturbance*" buffer zone will be established without delay around any piping plover or least tern pair that exhibits courtship or breeding behavior on lands controlled by Fort Riley. Nesting sites will be similarly protected from human disturbance. All human activity not specifically approved by the USFWS will be

excluded from the buffer zone until two weeks after the adults and any young produced there leave the nest vicinity. The size of the zone will be determined after conference with the USFWS. The installation prohibits the operation of off-road vehicles (ORVs) on its property, including the shorelines and sandbars of the rivers.

Fort Riley cannot impose buffer zones on adjacent lands to protect courtship or nesting. However, if Fort Riley controls access to those portions of the Kansas and Republican rivers where nesting or courtship activity occurs, Fort Riley will prohibit all access to the nesting site through the installation until said access is specifically approved by the USFWS.

3.4.2 Protect and maintain least tern and piping plover habitat.

Least tern and piping plover observations along the Kansas and Republican rivers indicate the rivers' usefulness as migratory habitat. The Kansas River is state-designated critical habitat for both species. Protecting and conserving least tern and piping plover habitat on Fort Riley requires limiting vegetation encroachment and debris accumulation on sandbar and beach habitat, and protecting the habitat from adverse physical destruction.

3.4.2.1 Prescription. Protect existing riverine habitat.

Action. All sandbars and shorelines of the Kansas and Republican rivers that are on Fort Riley are protected from adverse impacts. Adverse impacts include activities that result in channel destruction or alteration, or sandbar and beach destruction or alteration (impacts from water flow are excluded). The following activities are controlled within the normal river channel of the Kansas and Republican rivers on Fort Riley: construction; operations and maintenance activities; demolition; operation of vehicles; detonation of explosives; and recreational pursuits. Routine vehicle traffic on established bridges are not subject to this action. Fort Riley prohibits ORVs on installation lands.

3.4.2.2 Prescription. Educate Fort Riley personnel about requirement to protect riverine habitat.

Action. Established Integrated Training Area Management (ITAM) programs are used to disseminate information regarding the ESA, least terns and piping plovers to military personnel. For example, senior noncommissioned officers (E-6 – E-8) newly stationed at Fort Riley attend an orientation course (SNCOOC) at which they receive this information.

A brochure describing threatened and endangered species on Fort Riley is handed out to personnel during the SNCOOC and other training sessions. In addition, training restrictions to protect T&E species are included in Soldiers' and Leaders' Handbooks on the Environment and distributed through the ITAM program.

Additional programs will be developed, as needed, to publicize the requirements of riverine habitat conservation to all Department of Army personnel and contractors, and outdoor enthusiasts, who work, train or recreate on Fort Riley.

3.4.2.3 Prescription. Maintain existing habitat.

Action. Existing sandbars or island habitat may degrade over time and become too vegetated or too congested with logjams to continue providing suitable habitat. Fort Riley could potentially manage habitats not affected by water flow. Such habitats would have to be high enough out of the water to ensure their exposure during the period when terns and plovers were moving through the area. However, this height would make the habitats more susceptible to vegetation encroachment and require additional management through mechanical or chemical means. A combination of disking or plowing along with an herbicide labeled for use in and around aquatic habitats may provide the most desirable vegetation control (Boyd 1992). Habitat manipulations of riverine sandbars and shorelines would need to be coordinated and approved by the COE (Kansas City District) and the state of Kansas.

3.5 MONITORING PLAN

3.5.1 Map existing least tern and piping plover habitat on Fort Riley.

The least tern and piping plover habitat map will document the following items:

(1) Sandbars and beaches which occur adjacent to or within the installation boundaries.

(2) Any location with a documented least tern or piping plover sighting adjacent to or on Fort Riley.

Mapped information will be incorporated into the DES and ITAM programs' Geographic Information Systems (GIS). This information will be consulted when planning actions for the operation and maintenance of the installation and tactical training events during Training Requirements Integration (TRI).

3.5.2 Evaluate habitat value of Fort Riley sandbars, islands, and beaches for least tern and piping plover.

Adjustments to the 1990 evaluation of Fort Riley for least tern and piping plover habitat performed by the USFWS were required following the 1993 flood event. Sandbars and beach habitats are dynamic in nature, and may experience substantive changes from one year to another. Sandbar and beach areas occurring on Fort Riley will be evaluated annually for their potential to provide least tern and piping plover habitat by

using the Habitat Suitability Index Model for least terns (Carrecker 1985). The boundaries of sandbars and beaches will be recorded using a Global Positioning System and input into the DES and ITAM GIS programs. Changes in the sizes, locations, and suitability of sandbars and beaches for least terns and piping plovers will be documented. The need or value to enhance or manipulate each site will be addressed.

3.5.3 Search for least tern or piping plover nesting attempts on Fort Riley.

The Kansas and Republican rivers on Fort Riley will be floated to search for nesting least terns and piping plovers. The survey should occur 2-3 weeks after the springtime high water flow has subsided. This period varies from year to year, but usually occurs after mid-June. Suitable habitat will be walked to better locate the cryptic-colored birds.

3.5.4 Monitor nesting least terns and/or piping plovers found on Fort Riley.

Confirmed nests will be monitored weekly to determine their status and outcome. Monitoring will be carried out from a vantage point as far from the nests as possible that allows good visibility with optical equipment. Activity of the birds, including any indications of courtship feeding, copulation, incubation, or feeding of the young, will be documented at each visit.

The USFWS Regional Kansas Field Office will be notified promptly upon the discovery of any suspected nesting least terns or piping plovers on Fort Riley.

3.5.5 Monitor migrating least terns and piping plovers on Fort Riley.

Least tern and piping plover habitat on Fort Riley will be surveyed every7-10 days when migrating least terns and piping plovers are expected to be present (March 21 - May 31 and July 7 – September 15). Information recorded will be number of birds observed, location of birds, behavior of birds, and any bands or markings noticed on birds. Sightings will be reported to the USFWS Regional Kansas Field Office.

3.6 ESTIMATE OF TIME, COST, AND PERSONNEL NEEDED

It is estimated that accomplishing the tasks involved in least tern and piping plover management on Fort Riley will require approximately 25 staff-days annually. Another 10 days may be required if nesting is confirmed on Fort Riley. The time involvement of the various goals and actions is provided as follows:

Minimize injury and mortality. This will require letters and possibly meetings with electric utility companies and other facilities maintenance personnel, as well as military training staff. 4 staff-days annually.

Minimize disturbances at nesting sites. Identify, delineate, and enforce buffer zones along riverine areas if nesting sites become established. 10 staff-days, as needed.

Map appropriate habitat. This will require on-the-ground surveying of riverine habitats, evaluating that habitat, and noting annual changes in condition of that habitat. 3 staff-days annually.

Migratory and nesting surveys. This will involve performing annual surveys for these species, compiling data and writing report. 15 staff-days annually.

Develop and distribute hard copy of habitat map. This will require development of a GIS-based data layer depicting least tern and piping plover habitat locations and creation of paper copies of the map generated. 3 staff-days.

3.7 CHECKLIST OF TASKS

3.7.1 Protect individual least terns and piping plovers from human-induced injury.

The presence of unmarked power lines, towers and other structures into which least terns and piping plovers may fly is hazardous. Many transmission lines, poles, and towers exist on Fort Riley. All may pose some degree of threat to these species. However, techniques are available to mark such structures to eliminate or greatly reduce the hazard.

_____Any projects to construct new or modify existing aerial structures on Fort Riley will be reviewed by the DES, Conservation Division at least 30 days prior to project implementation for need to incorporate line markers. section 3.4.1.1

_____Human disturbance at nesting areas may have several negative effects. Human presence may inhibit courtship, incubation and brooding behaviors. People and vehicles can trample nests and destroy young. Unleashed pets may prey upon adults, young and eggs.

_____A "*no disturbance*" buffer zone large enough to protect nesting least terns or piping plovers from disturbance will be established without delay around any active nesting area that is confirmed to exist by the DES, Conservation Division. All human activity not specifically approved by the USFWS will be excluded from the zone until two weeks after the adults and any young leave the nest vicinity. section 3.4.1.2

3.7.2 Protect and maintain least tern and piping plover habitat.

Protecting and maintaining least tern and piping plover habitat on Fort Riley requires limiting vegetation encroachment and debris accumulation on sandbar and shoreline habitat, and protecting the habitat from adverse physical destruction.

_____All sandbars and shorelines that are on Fort Riley will be protected from adverse impacts. The following activities are controlled within the normal river channel of the Kansas and Republican rivers on Fort Riley: construction, operations and maintenance activities, demolition, operation of vehicles, detonation of explosives, and recreational pursuits. section 3.4.2.1

_____Develop information/education materials and other programs, as needed, to disseminate information regarding “no disturbance” buffer zones and protection of riverine habitat to installation personnel. section 3.4.2.2

3.7.3 Monitor least terns and piping plovers, and their habitat, on Fort Riley.

_____ Least terns and piping plovers have been observed on Fort Riley, and are expected to continue occurring on the installation as, at least rare, transients. Numbers of breeding pairs of both species have increased recently in eastern Kansas, particularly along the Kansas River.

_____Map existing least tern and piping plover habitat on Fort Riley. The map will include sandbars and beaches that occur adjacent to or within the installation boundaries, and any location where a least tern or piping plover has been observed on Fort Riley. section 3.5.1

_____Incorporate habitat map into the installation’s GIS programs. section 3.5.1

_____Consult GIS least tern and piping plover habitat map when planning actions for the operation and maintenance of the installation and tactical training events during TRI. section 3.5.1

_____Evaluate sandbars and beaches on Fort Riley as least tern and piping plover habitat. section 3.5.2

_____Annually monitor existing habitat, documenting suitability for least terns and piping plovers and determining need for enhancement or manipulation. section 3.5.2

_____Float the Kansas and Republican rivers on Fort Riley after mid-June to search for nesting least terns and/or piping plovers. Walk suitable habitat to better detect nesting birds. section 3.5.3

_____If a nesting attempt is confirmed, it will be monitored weekly to determine its status and outcome. section 3.5.4

_____Least tern and piping plover habitat on Fort Riley will be surveyed every 7-10 days when migrating least terns and piping plovers are expected to be present (March 21 - May 31 and July 7 – September 15). section 3.5.5

_____Report to the USFWS Regional Kansas Field Office all observations of least terns and piping plovers on Fort Riley. section 3.5.5

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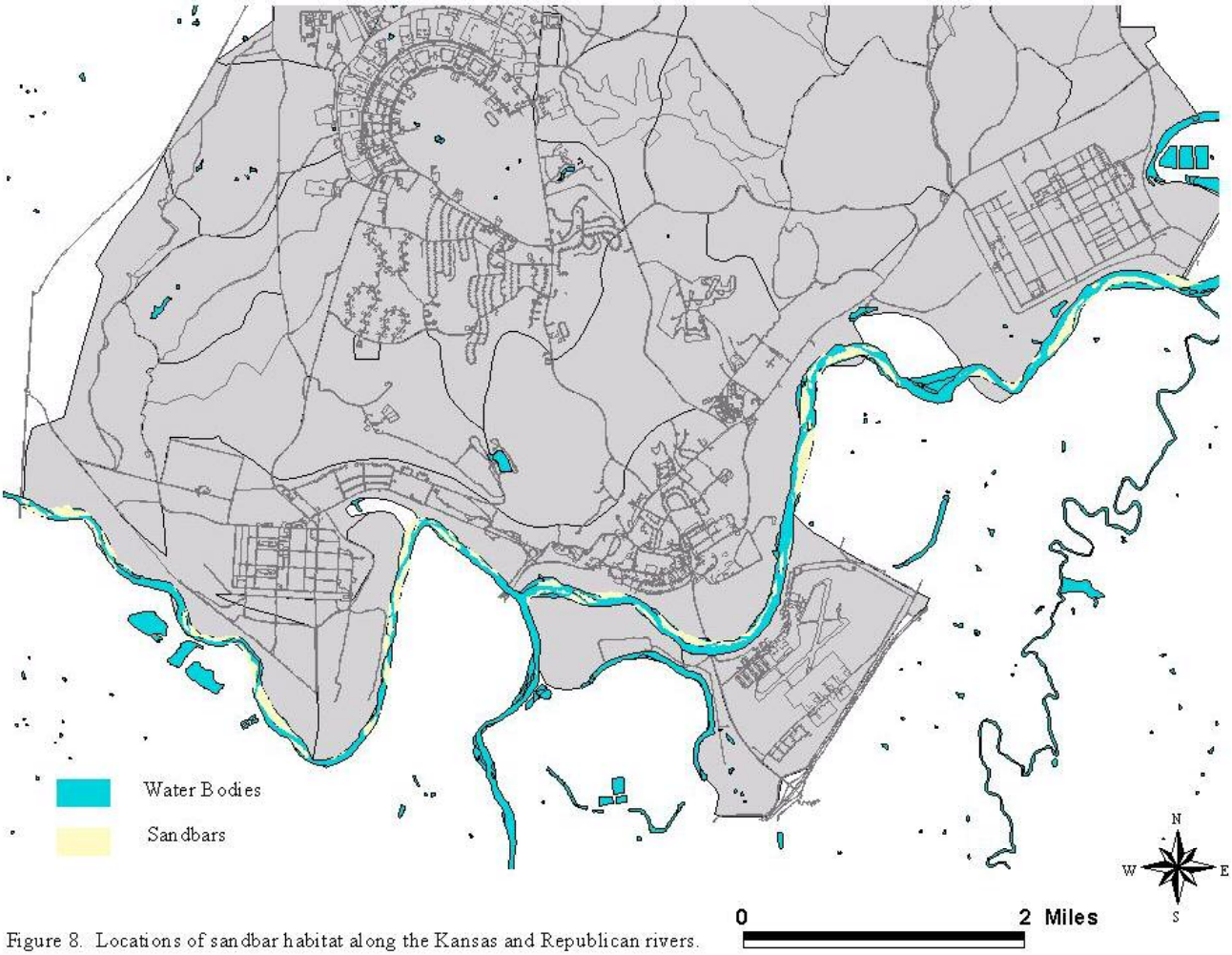

Figure 8. Locations of sandbar habitat along the Kansas and Republican rivers.

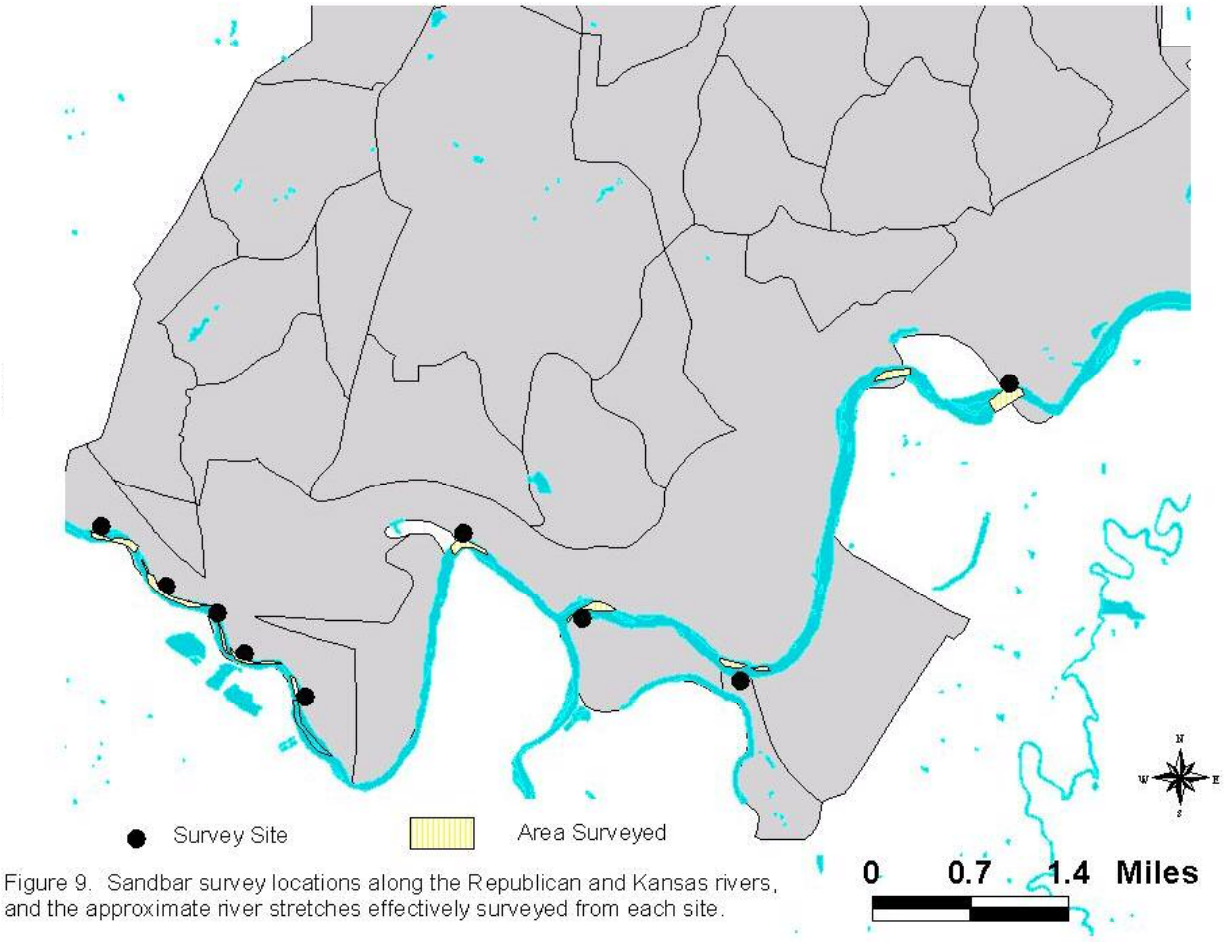

Figure 9. Sandbar survey locations along the Republican and Kansas rivers, and the approximate river stretches effectively surveyed from each site.

SECTION 4.0 TOPEKA SHINER MANAGEMENT PLAN

Executive Summary

Current Species Status: The Topeka shiner is federally listed as endangered and Kansas-listed as threatened. This fish was historically a common species of prairie streams in Kansas, Nebraska, Iowa, Missouri and South Dakota. Its current range is severely restricted. Topeka shiners are documented in five streams on Fort Riley. These are Wildcat, Seven-Mile, Wind, Honey and Little Arkansas creeks. All five of these streams are considered critical habitat by the Kansas Department of Wildlife and Parks. Other streams containing apparently suitable Topeka shiner habitat occur on Fort Riley.

Habitat Requirements and Limiting Factors: Topeka shiners require streams with high water quality to meet their biological needs. Increased water turbidity, stream eutrophication, streambed modification, and stream channel impoundment diminish and/or destroy habitat quality for this species. Threats to Topeka shiners on Fort Riley include habitat destruction, reduction in water quality, and channel impoundment.

Management Objectives: Protect Topeka shiners and their habitat on Fort Riley.

Conservation Goals: The conservation goals are to protect individual Topeka shiners present on the installation from "takings, develop a protocol for establishing population goals and to maintain existing habitat on Fort Riley.

The protocol for establishing population goals is uncertain at this time because Topeka shiner populations are eruptive and mobile. Consequently, this management plan does not establish specific population goals for Topeka shiners on Fort Riley. However, Fort Riley will communicate with the U. S. Fish and Wildlife Service (USFWS) if the USFWS prepares a recovery plan that includes population goals.

Actions Needed: Fort Riley will: (1) protect from adverse impacts all stream reaches identified in Figure 11; (2) monitor Topeka shiners on Fort Riley; and (3) develop protocol to determine population goals consistent with the USFWS Recovery Plan.

Specifically, Fort Riley, will: (a) annually seine all streams in which Topeka shiners are known to occur; (b) survey streams with apparently suitable habitat, but without known Topeka shiners, at least twice every five years; (c) review activities that may affect Topeka shiner streams prior to initiating the activity; (d) develop an environmental awareness program to educate Fort Riley personnel on stream quality maintenance; (e) restore stream habitat; (f) control the construction of water impounding dams on those streams identified in Figure 11.

Total Estimated Cost of Conservation Actions: It is estimated that accomplishing the tasks involved in the management of the Topeka shiner on Fort Riley will require

approximately 81 staff-days annually. The primary cost involves staff salary and development of I/E materials.

TOPEKA SHINER MANAGEMENT PLAN

4.1 INTRODUCTION

The directives of this Endangered Species Management Plan (ESMP) are: (1) to present information on the Topeka shiner (*Notropis topeka*), a species federally listed as endangered and Kansas-listed as threatened that is present on Fort Riley, Kansas (Fort Riley); (2) to discuss the protection of the Topeka shiner on Fort Riley; (3) to define conservation goals; and (4) to outline a plan for management of the species and its habitat that achieves stated conservation goals. These directives are consistent with the management recommendations provided to Fort Riley by the U. S. Fish & Wildlife Service (USFWS) in 1995.

This ESMP is based on and is consistent with the ESA, the Kansas Nongame and Endangered Species Conservation Act of 1975 and Army Regulations (AR 200-3). This plan does not supersede Section 7 consultation requirements with the USFWS, or replace the need to obtain special permits from the Kansas Department of Wildlife & Parks (KDWP). Any action that may directly or indirectly affect the Topeka shiner or its preferred habitat must be coordinated with the USFWS and KDWP by the Fort Riley Directorate of Environment and Safety (DES), Conservation Division except under the circumstances described below.

4.2 SPECIES INFORMATION

4.2.1 Description. The Topeka shiner grows to a length of 2.25 inches. Its body is silvery, with a dark streak along each side, a dark chevron mark at the base of the tail fin, and a reddish dorsal fin. Breeding males may change colors, with bodies turning blue and all fins turning red. The Topeka shiner's scales have a distinct cross-hatching outline. Dorsal scales are as large as the side scales. Topeka shiners may be confused with sand shiners (*Notropis ludibundus*), suckermouth minnows (*Phenacobius mirabilis*) and creek chubs (*Semotilus atromaculatus*), other minnow species that have a dark spot at the base of their tail fins and/or crosshatched scales. However, sand shiners have a black line at the base of their dorsal fin, and never have reddish fins. Suckermouth minnows are identified by their smaller scales and fleshy lips located on the ventral side of the head. Creek chubs may be identified by their large mouth, large head, and lack of crosshatched scales. Breeding redfin shiner (*Lythrurus umbratilis*) and red shiner (*Cyprinella lutrensis*) males also develop blue bodies and reddish fins. Redfin shiners have small, nearly invisible scales along their upper sides that are not crosshatched. Breeding red shiners show a compressed body with a rosy crescent shape behind the head.

4.2.2 Habitat/Ecology. The Topeka shiner typically occurs in small, low order[2], prairie streams with high water quality and cool temperatures (USFWS 1993). These streams generally are perennial. However, Topeka shiners may also occur in streams that become intermittent during the summer. Topeka shiners inhabit quiet pools that have stable water levels near the headwaters of the streams. At times when surface flow ceases, springs or groundwater seepage maintains these pools. These streams usually have clear water with a predominantly gravel or sand substrate. There is little rooted aquatic vegetation associated with Topeka shiner populations (Minckley and Cross 1959, Cross and Collins 1975).

Habitat conditions become unsuitable for this species when increased water turbidity creates a silt layer along the streambed, excess nutrient enrichment leads to stream eutrophication, or stream dewatering eliminates stable water levels of pools (USFWS 1993). Local extirpation results when conditions required for reproduction of this species are no longer met. The increased siltation resulting from agricultural development eliminated Topeka shiners from habitats west of the Flints Hills Region in Kansas (Cross and Moss 1987) and reduced the amount of habitat in Missouri (Pflieger 1975).

Streams containing Topeka shiners are relatively undisturbed. They have not been impounded or channelized and usually do not drain areas subject to high silt loads in water runoff (Drilling 1986). Reduction in water quality due to groundwater depletion, artificial regulation of flows, and certain agricultural practices are detrimental to this species (USFWS 1993).

Reproduction occurs between late June and early August. Males establish territories near green sunfish or orange-spotted sunfish nests. Spawning occurs over the sunfish nests (Drilling 1986). Topeka shiners apparently reproduce more successfully in times of drought, when streams approach intermittence. The species is more widespread and abundant throughout the stream system during drought conditions. During periods with average or above-average precipitation, Topeka shiners occur primarily in the headwater tributaries (Minckley and Cross 1959). This leads to a cyclic tendency of Topeka shiner population levels.

Topeka shiners occupy the lower half of the water column in single-species schools, or with a few associated species. In the Kansas River basin, fishes that have most often occurred with Topeka shiners are white sucker (*Catostomus commersonii*), creek chub, southern redbelly dace (*Phoxinus erythrogaster*), common shiner, bluntnose minnow (*Pimephales notatus*), stoneroller (*Campostoma anomalum*), orangethroat darter (*Etheostoma spectabile*), johnny darter (*E. nigrum*) and rosyface shiner [(*Notropis rubellus*) (Minckley and Cross 1959)].

4.2.3 Distribution. The Topeka shiner is a prairie species formerly widespread throughout Kansas, Nebraska, northern Iowa, Missouri, and South Dakota. Its current

2 Stream order is a classification based on branching of streams. The smallest, unbranched, tributary streams that appear on a topographic, 7 1/2 minute quadrangle map (1:24,000 scale) are designated order 1.

range is restricted to less than ten percent of its historic range (USFWS 1997a). Topeka shiners now occur in abundance only in several tributaries to the Missouri River in Missouri and South Dakota, and in the Kansas Flint Hills headwater streams of the Cottonwood and Kansas rivers (Drilling 1986, USFWS 1993).

Fort Riley lies within the Flint Hills Region of Kansas and has several low order streams that drain to the Kansas River. Several of these were considered to have apparently suitable habitat for the Topeka shiner, but the species was considered extirpated on Fort Riley (USFWS 1992). The streams identified by the USFWS as having suitable habitat (USFWS 1994) were Honey, Timber, Rush, Three-Mile, Four-Mile, Madison, Forsyth, Wildcat, Seven-Mile, Wind and Wildcat creeks. Topeka shiners were found in four streams on Fort Riley during subsequent surveys conducted between 1995-2000. These are Wildcat, Seven-Mile, Wind and Little Arkansas creeks (Figure 10). However, Topeka shiners were not captured in all streams in any one year or in any one stream during all survey years. The 2000 surveys captured Topeka shiners in Seven-Mile and Wildcat creeks. The 2003 surveys found abundant Topeka shiner numbers in all four of the streams in which they were previously documented and in a fifth stream, Honey Creek. This was the first time a Topeka shiner had been documented from this creek. KDWP established state-designated critical habitat for the Topeka shiner to include the main stem and tributary reaches of Wildcat, Little Arkansas, and Seven-Mile creeks in 2000. Although Wind Creek and Honey Creek have not been officially designated state-designated critical habitat for the Topeka shiner, they do have recent collection records (2003) and therefore are considered to be state-designated critical habitat for the Topeka shiner by KDWP.

Topeka shiners have not been found in Rush, Timber and Madison creeks during Fort Riley surveys. No historical Topeka shiner collections are known from these three streams. These streams and Farnum Creek are not considered likely to support populations of Topeka shiners due to their discharge into Milford Lake. The USFWS cited mainstem reservoir development as a significant factor negatively affecting Topeka shiner populations (1998). A recent Kansas State University study of fish fauna on Fort Riley found a definite “lake effect” influence on species in these streams (Quist 1999), where high populations of predatory fish inhibit the growth of native minnow populations. Milford Lake is not believed to be a “harbor” or “source” for Topeka shiners (Tabor pers. comm.). Consequently, Timber, Rush, Farnum and Madison creeks are not considered to contain Topeka shiner habitat.

Topeka shiners have not been found in Three-Mile, Four-Mile and Forsyth creeks. However, all those streams, apparently, contain suitable habitat for the species and are interconnected with other streams where the Topeka shiner occurs. Consequently, they are considered potential habitat for the species. Figure 11 shows the streams on Fort Riley that are considered as actual and potential Topeka shiner habitat.

4.2.4 Reasons for Listing. The alteration of streams throughout this species’ range has led to a drastic reduction in population levels. More than ninety-five percent of the remaining Topeka shiner populations occur on privately-owned land. Land and water

practices that negatively impact Topeka shiner habitat are expected to continue on those lands and lead to further reductions in this species' range. Continuing threats to Topeka shiners resulted in this species being listed as endangered throughout its range under the ESA (63 Federal Register 69008-021, December 15, 1998).

The USFWS has generated a list of proposed critical habitat for the Topeka shiner. Stream reaches on Fort Riley were excluded from being listed. Section 318 of the National Defense Authorization Act for Fiscal Year 2004 **(**Public Law No: 108-136) amended the Endangered Species Act by adding a new section 4(a)(3), which allows an exemption to critical habitat designation on any lands or other geographical areas owned or controlled by the Department of Defense, or designated for its use, that are subject to an integrated natural resources management plan prepared under section 101 of the Sikes Act (16 U.S.C. 670a), if the Secretary of the Interior determines in writing that such plan provides a benefit to the species for which critical habitat is proposed for designation.

4.2.5 Conservation Measures. Current conservation actions involve monitoring known Topeka shiner populations, maintaining habitat in watersheds containing these populations, and searching for additional populations. Reintroduction methodology is being developed.

4.3 CONSERVATION GOALS

4.3.1 Protect individual Topeka shiners present on Fort Riley.

4.3.2 Develop protocol for determining population goals.

4.3.3 Maintain abundance and quality of Topeka shiner habitat.

4.4 MANAGEMENT PRESCRIPTIONS AND ACTIONS

4.4.1 Protect individual Topeka shiners from human-induced injury.

Pesticides and other chemicals, if introduced into stream waters, may adversely affect Topeka shiners or the invertebrates upon which the fish feed. Compliance with the Clean Water Act, the Federal Insecticide, Fungicide and Rodenticide Act, DoD Directives and Army Regulations 200-5 protect against chemical contamination. These laws and regulations provide sufficient protection for Topeka shiners. Consequently, this plan will not place further restrictions on the use of pesticides or other chemicals.

Mainstem reservoir developments and tributary impoundments have adversely impacted the species. Topeka shiner populations have been eliminated from streams both above and below dams following the construction of stream impoundments in Kansas and Missouri (USFWS 1993). Impoundment of streams is also deleterious to congeneric species of Topeka shiners (Winston et al. 1991). Pond and lake

construction has several negative impacts. The dams eliminate the scouring floods that create pool habitat downstream and maintain a rocky, silt-free substrate (USFWS 1993). Upstream habitat may be converted to deep, open water habitat behind the dam. Upstream populations seeking refuge in the impoundment during drought may be eaten by predatory fish. These predatory fish also move upstream and downstream from the impoundment where they pose a predatory threat to Topeka shiners that did not naturally exist (USFWS 1993).

4.4.1.1 Prescription: Control construction of permanent, water impounding dams on streams of Fort Riley.

Action. Consultation with the USFWS and KDWP will occur during the planning process for construction of water impounding structures on any stream identified in Figure 11.

4.4.1.2 Prescription: Protect Topeka shiners from bait-fish seining.

Action. Prohibit bait-fish seining in Fort Riley Regulation 210-15 (Fort Riley Hunting and Fishing Regulations). Enforcement conducted by MPs and Fort Riley's civilian conservation officer. Educate Fort Riley anglers of the prohibition, and post in fishing brochures and on the Fort Riley Internet Page.

4.4.2 Develop protocol for determining population goals.

4.4.2.1 Prescription: Establish Topeka shiner population goals for Fort Riley.

Action. Fort Riley will continue discussions with the USFWS and KDWP to establish the protocol for determining population goals that are consistent with the species' recovery plan goals and objectives.

4.4.3 Protect, maintain, and restore small stream habitat.

Topeka shiners require streams with high water quality to meet all of their needs throughout the life cycle (USFWS 1993). High water quality requires minimal disturbance to the streambed. Stream quality also is directly related to maintaining a vegetative filter strip along the streambed to capture soil runoff before it reaches the stream. Protection and maintenance of high quality water in all streams will be a priority.

It is DA policy (AR 200-3 ch. 2-21) to avoid adverse impacts to existing aquatic resources. Army actions affecting wetlands require an environmental review by the DES, Conservation Division in accordance with AR 200-1, AR 200-2, and applicable federal and state laws. U.S. Army Corps of Engineers permits may be required before commencing any construction in a navigable water. A navigable water, as defined under the Clean Water Act and in the Code of Federal Regulations, Title 33, Part 328, includes low order streams.

4.4.3.1 Prescription Prevent degradation of existing streams.

Action. All streams shown in Figure 11 that have recent documentation of Topeka shiners including Wind, Wildcat, Seven-Mile, Honey and Little Arkansas will be protected from adverse impacts. Adverse impacts include activities that result in channel destruction or alteration, increase water turbidity or eutrophication, or destroy vegetation filter strips. The following activities will be controlled within 50 feet on either side of the streams shown in Figure 11: construction, operations and maintenance activities, demolition, operation of vehicles, timber harvest, detonation of explosives, and recreational pursuits. Vehicle traffic on improved stream crossings and bridges are not subject to this action. Actions affecting all other streams shown in Figure 11 (i.e. those that do not have recent documentation of Topeka shiners) will not require consultation with the USFWS and KDWP if DES deems the action will not likely to adversely affect Topeka shiners. If Topeka shiners are positively documented in any other stream, consultation with the USFWS and KDWP will be mandatory for actions affecting that stream.

4.4.3.2 Prescription. Educate Fort Riley personnel about the requirement to protect Topeka shiner habitat.

Action. Established training programs are used to disseminate information regarding the ESA and Topeka shiners to military personnel. For example, senior noncommissioned officers (E-6 – E-8) newly stationed at Fort Riley attend an orientation course (SNCOOC) at which they receive this information.

A brochure describing Threatened and Endangered (T&E) species on Fort Riley is handed out to personnel during the SNCOOC and other training sessions. In addition, training restrictions to protect T&E species are included in Soldiers' and Leaders' Handbooks on the Environment and distributed through the ITAM program.

In the summer of 2003, DES became permitted by the USFWS to display up to six live Topeka shiners. The fish were acquired from a long-term experiment at the University of Kansas. A sign explaining the display and an informative bookmark are part of the display. Information regarding the Topeka shiners has been placed on the Fort Riley web page.

Additional programs will be developed, as needed, to publicize the requirements of Topeka shiner habitat conservation to all Department of Army personnel and contractors who work or train on Fort Riley.

The streams on Fort Riley identified as providing apparently suitable habitat for Topeka shiners have been incorporated into the DES and ITAM programs' Geographic Information Systems (GIS). This information will be consulted when planning actions for the operation and maintenance of the installation and tactical training events during Training Requirements Integration (TRI).

4.4.3.3 Prescription. Restore degraded stream habitat.

Action. Streams shown in Figure 11 will be restored, as needed, by reshaping damaged banks or channels, establishing revetments, or reestablishing vegetative filter strips.

4.4.3.4 Prescription: Continue development of hardened, low water fords.

Action. Construction and maintenance of hardened, low water fords will precisely follow protocol approved by the USFWS and KDWP (Appendix 1). Important components of this protocol are: constructing hardened, low water fords level with the natural streambed, limiting ford width to approximately 30 feet, and using best management practices to control silt entering streams from construction actions. Deviation from this protocol will degrade, rather than improve, stream quality.

4.5 MONITORING PLAN

Streams that apparently have Topeka shiner habitat on Fort Riley require further surveying for this species. Population characteristics are unknown in streams where Topeka shiners are present.

4.5.1 Determine if Topeka shiners are present in Fort Riley streams that apparently have appropriate habitat.

Surveys will be conducted in all streams that have, or apparently have, suitable Topeka shiner habitat. Annual surveys will be conducted in streams in which Topeka shiners have been found. These are Wildcat, Wind, Little Arkansas, Honey and Seven-Mile creeks. Surveys will be conducted two out of every five years in streams in which Topeka shiners have not been documented. This will include Three-Mile, Four-Mile, Timber, Madison, Rush, and Forsyth creeks. Surveys will concentrate on pools and runs in these streams. A qualified biologist who has experience with plains minnows will verify fish identification.

Topeka shiner capture sites will be plotted into the DES and ITAM programs' GIS database. This information will be used to plan actions for the operation and maintenance of the installation and tactical training events during TRI.

4.5.2 Conduct long-term monitoring of small-stream fish populations.

Long-term monitoring of Topeka shiners is necessary because this is a mobile species that readily moves in response to water flow conditions. Previously uninhabited streams may be colonized as a result of high water-flow. The Kansas River is a travel corridor for Topeka shiners on a localized scale and provides the means by which this species can colonize appropriate habitat.

A second reason that long-term monitoring is necessary is that species may be missed during initial surveys. Negative results from a biological survey can rarely provide certainty that a species does not occur in a given area. This is particularly true for an inconspicuous or a low-density species.

Annual surveys will be conducted in streams known to have Topeka shiners. Surveys for the Topeka shiner will be conducted twice every five years in the streams where Topeka shiners have not been found. Surveys will be continued indefinitely into the future.

4.5.3 Determine the status of Topeka shiner populations.
Fish assemblages present at each sample location will be recorded to document any changes in community structure over time. Numbers of each species captured will provide estimates of the density of Topeka shiner and other fish populations on the installation.

4.6 ESTIMATE OF TIME, COST, AND PERSONNEL NEEDED

It is estimated that accomplishing the tasks involved in the protection and management of Topeka shiners on Fort Riley will require 81 staff-days annually. Time involvement of the various goals and actions is provided as follows:

Control construction of dams. This will require coordination with training and construction personnel. 1 staff-day annually.

Establish population goals. This will require discussions and possible meetings with personnel from the USFWS and KDWP. 2 staff-days (dependent on recovery plan).

Protect, maintain, and enhance stream habitat. This will require annual habitat monitoring, plus any restoration work or vegetative planting required; also coordination with training personnel. 15 staff-days annually.

Distribute hard copy of Topeka shiner habitat map. This will require distributing a GIS-based data layer depicting Topeka shiner habitat locations, when requested. 3 staff-days annually.

Review NEPA documentation, prepare Biological Assessments. This will require review of NEPA documentation for Fort Riley projects and for Biological Assessments as needed. 30 staff-days annually

Document occurrence of Topeka shiner. This will require conducting qualitative fish surveys in tributary streams, identifying and cataloging collected specimens; and repeating surveys. 30 staff-days annually.

4.7 CHECKLIST OF TASKS

4.7.1 Protect individual Topeka shiners from human-induced injury.

Topeka shiners are eliminated from streams once the streams are impounded. Pond and lake construction has several negative impacts. The dams eliminate the scouring floods that create Topeka shiner habitat downstream. Upstream habitat is converted to deep, open water behind the dam. Topeka shiners often are subjected to unnatural predatory pressure.

_____Control construction of permanent, water impounding dams on streams of Fort Riley. Consultation with the USFWS and KDWP will occur during the planning process for construction of water-impounding structures on any stream identified in Figure 11. section 4.4.1.1

_____Prohibit bait-fish seining in Fort Riley Regulation 210-15. section 4.4.1.2

_____Educate anglers of prohibition against bait-fish seining. section 4.4.1.2

4.7.2 Determine population goals for Topeka shiners in Fort Riley streams.

_____Discussions with the USFWS and KDWP will establish Topeka shiner population goals that are consistent with the species recovery plan's goals and objectives. section 544.2.1

4.7.3 Protect, maintain, and restore small stream habitat.

Topeka shiners require streams with high water quality to meet all of their needs throughout the life cycle. High water quality requires minimal disturbance to the streambed and its vegetative filter strip. Protection and maintenance of high quality water in all streams will be a priority.

_____Perform an environmental analysis and obtain applicable federal and state permits for any action affecting wetlands, in accordance with AR 200-1, AR 200-2. section 4.4.3

_____Protect all streams shown in Figure 11 from adverse impacts. Adverse impacts include activities that result in channel destruction or alteration, increase water turbidity, or remove vegetation filter strips. section 4.4.3.1

_____Control the following activities within 50 feet on either side of the streams shown in Figure 11: construction, operations and maintenance, demolition, operation of vehicles, timber harvest, detonation of explosives, and recreational pursuits. section 4.4.3.1

_____Disseminate information regarding Topeka shiners to military personnel through established programs. section 4.4.3.2

_____Include T&E species' training restrictions in the Soldiers' and Leaders' Handbooks on the Environment, which are distributed through the ITAM program. section 4.4.3.2

_____Develop additional programs, as needed, to publicize the requirements needed for Topeka shiner habitat conservation to all Department of the Army personnel and contractors who work or train upon Fort Riley. section 4.4.3.2

_____Review the GIS database for stream locations that provide apparently suitable habitat for Topeka shiners when planning actions for the operation and maintenance of the installation during TRI. section 4.4.3.2

_____Monitor stream habitat and restore as needed. Restoration actions that may be required include bank reconstruction, establishing revetments, and/or planting vegetative filter strips at least 50 feet wide. section 4.4.3.3

_____Construction and maintenance of hardened, low water fords will follow protocol approved by the USFWS and KDWP. section 4.4.3.4

4.7.4 Monitor Topeka shiners on Fort Riley.

Topeka shiners have not been located in some streams with apparently suitable habitat for the species. Population characteristics are unknown in streams with Topeka shiners. This is a mobile species that readily moves in response to water flow conditions. Previously uninhabited streams may be colonized as a result of high water-flow. The Kansas River is a travel corridor for Topeka shiners and provides the means by which this species can colonize appropriate habitat.

_____Conduct surveys in Three-Mile, Four-Mile, Seven-Mile, Wildcat, Honey, Wind, Little Arkansas, Timber, Rush, and Forsyth creeks. section 4.5.1

_____Include Topeka shiner capture sites in GIS database. section 4.5.1.

_____Conduct long-term monitoring according to schedule. section 4.5.2

_____Record the number of each species captured per survey to provide estimates of the density of fish species per stream. section 4.5.3

4.8 LITERATURE CITED

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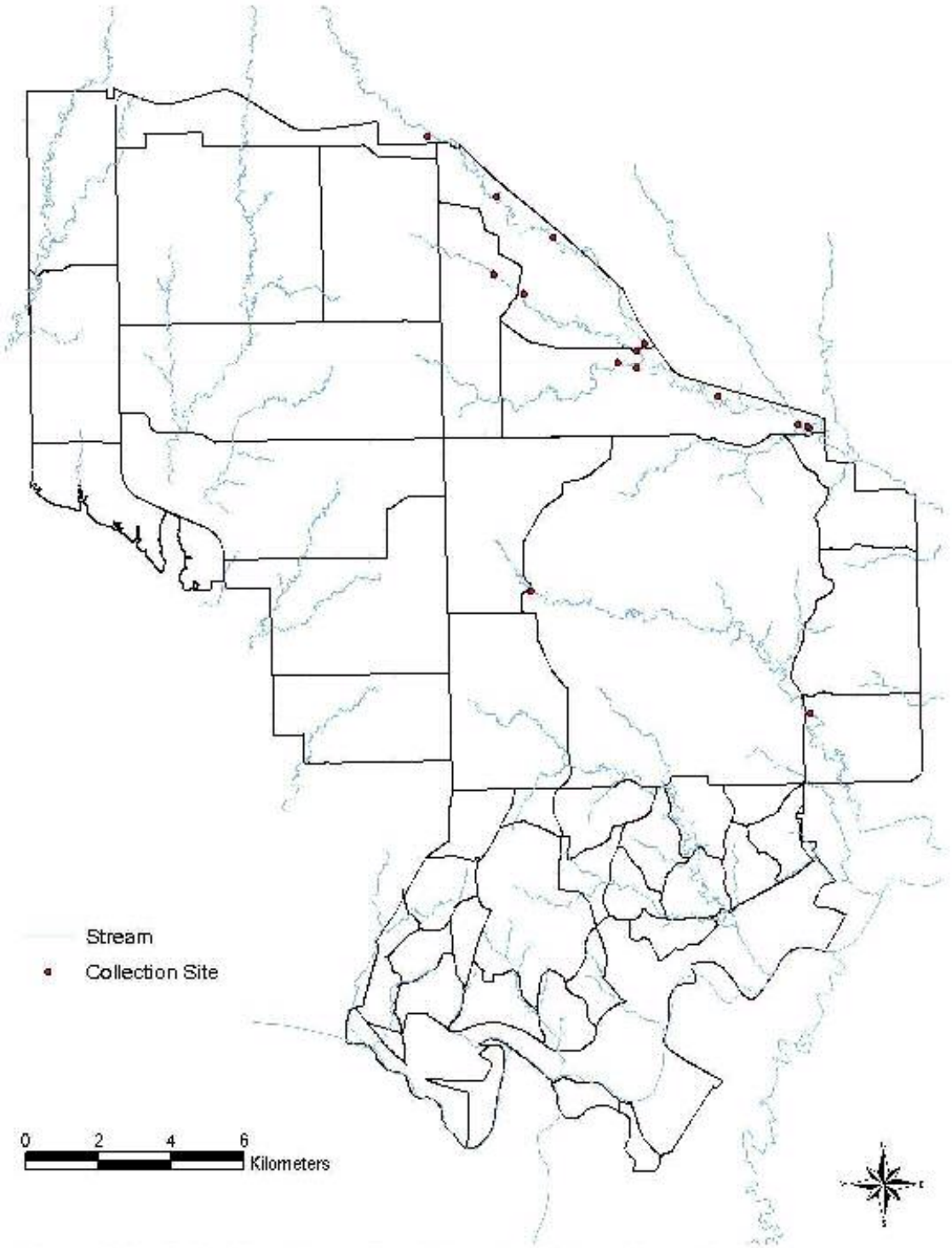

Figure 10. Collection Records of Topeka Shiners from Fort Riley.

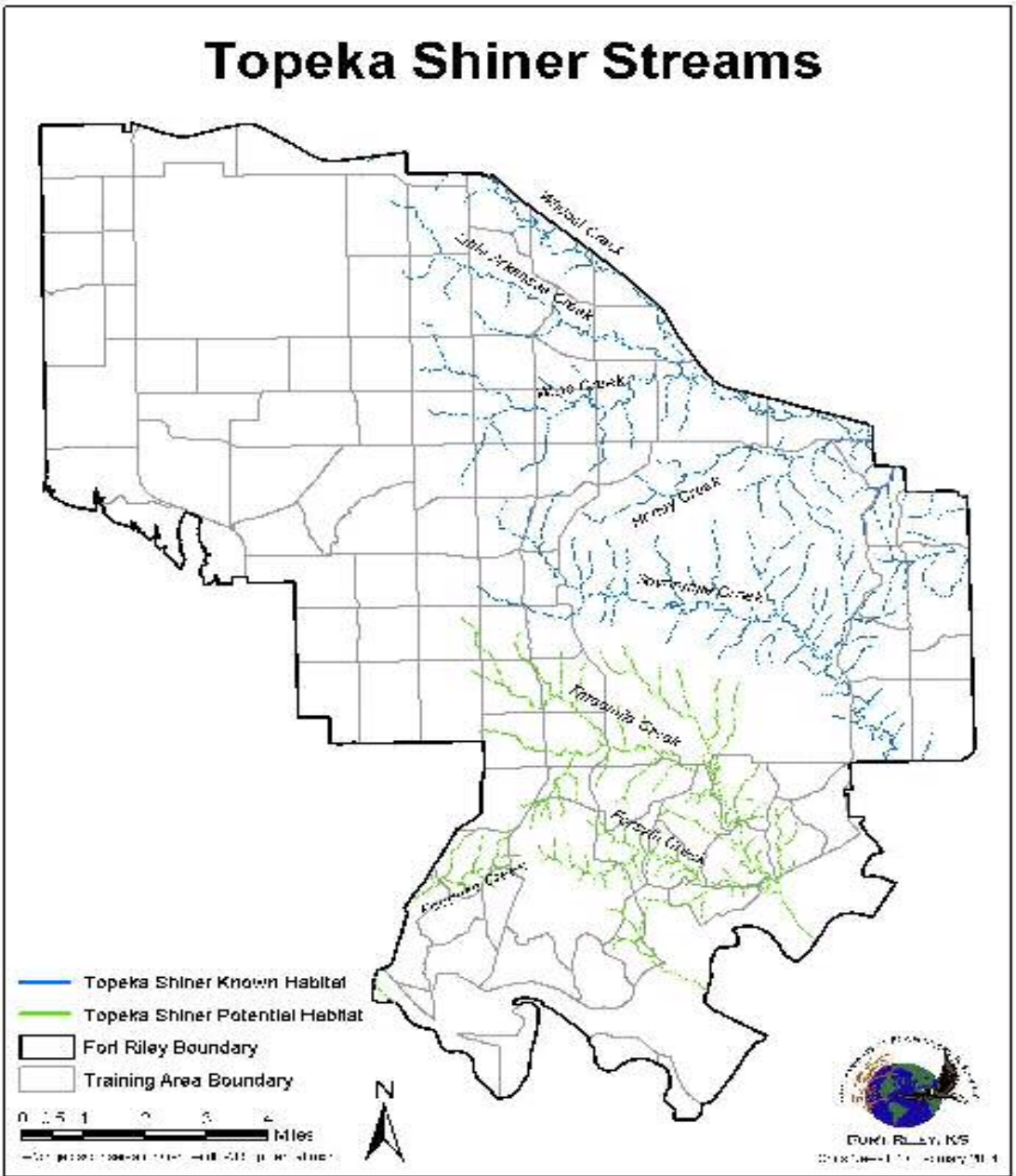

Figure 11. Stream locations identified as possessing Topeka Shiner habitat.

SECTION 5.0 HENSLOW'S SPARROW MANAGEMENT PLAN

Executive Summary

Current Species Status: The U.S. Fish and Wildlife Service (USFWS) considers the Henslow's sparrow as a Species of Concern (SOC). This grassland bird has experienced a significant decline in population, primarily due to habitat changes.

Habitat Requirements and Limiting Factors: Henslow's sparrows require "old growth" tallgrass prairie with little or no woody vegetation.

Management Objectives: Protect Henslow's sparrows and their habitat on Fort Riley.

Conservation Goals: The conservation goals are to protect and improve the grassland habitat on Fort Riley used by Henslow's sparrows and to monitor the breeding population.

Actions Needed: Fort Riley will: (1) maintain and improve grassland quality through prescribed burning, haying and woody plant removal; (2) monitor Henslow's sparrows on Fort Riley and on adjacent lands; and (3) keep the Fort Riley Command Group informed of the Henslow's sparrow habitat requirements and the potential impact of a change in federal status.

Total Estimated Cost of Conservation Actions: It is estimated that accomplishing the tasks involved in the management of the Henslow's sparrow on Fort Riley will require approximately 80 staff-days annually. The primary cost involves staff salary, woody plant control and supplies.

5.1 Introduction

The purpose of this Endangered Species Management Plan (ESMP) is to: (1) to present information on the Henslow's sparrow (*Ammodramus henslowii*) that is present on Fort Riley, Kansas (Fort Riley) and adjacent property; (2) to discuss the protection of the Henslow's sparrow on Fort Riley and adjacent property; (3) to define conservation goals; and (4) to outline a plan for management of the species and its habitat that will enable achievement of conservation goals.

5.2 SPECIES INFORMATION

5.2.1 Federal Status. The U.S. Fish and Wildlife Service reviewed a petition to list the Henslow's sparrow as threatened or endangered, with the final rule published on 22 August 1998 in the Federal Register. The rule classified the Henslow's sparrow as a "Species of Concern", and noted that although the population of Henslow's sparrows has experienced a considerable decline, reclassification to threatened or endangered is not warranted at this time. "Species of Concern" is an informal term that refers to those

species that the USFWS believes might be in need of concerted conservation actions to avoid future listing. The USFWS specifically cited the Fort Riley Military Reservation in the 22 August 1998 Federal Register as a key component in the determination not to list the Henslow's sparrow as threatened or endangered. The decision to include the Henslow's sparrow in this version of the ESMP is to take a proactive stance in maintaining and improving grassland habitat in the region to ensure Fort Riley's military mission is not jeopardized by the potential for future listing of the Henslow's sparrow. Additionally, the conservation efforts outlined in this ESMP will help to improve habitat for the greater prairie chicken, which has not been petitioned for listing, but has also experienced a significant decline in population. The listing of either of these grassland birds could have a significant effect on the amount of land available for military training on Fort Riley.

5 2.2 Description. Eckert (1985) describes the Henslow's sparrow in this way: "This bird has perhaps the most flat-headed profile of all sparrows, making its bill appear a few sizes too large." The species is aptly colored for an Army Reservation, with its striped head a drab olive color distinctive from other sparrow species in Kansas. The wings are a dull rust color, and the breast and sides are streaked." Two dark whisker marks appear below each eye, with a dark smudge behind the eye. The species is shy and secretive, and its unmusical one- or two-note call makes it difficult to locate in tall grass. It grows to a length of 4.5-5.5"

5.2.3 Habitat/Ecology. One of the most comprehensive descriptions of the habitat and ecology of the Henslow's sparrow comes from Hekert 2001 as follows:

5.2.3.1 Breeding range: Henslow's sparrows breed from southern Minnesota through Wisconsin and Michigan to southern Ontario, south to northeastern Oklahoma, Illinois, and Kentucky, and east to eastern North Carolina and New Hampshire (National Geographic Society 1987).

5.2.3.2 Suitable habitat: Henslow's sparrows use grasslands that have well-developed litter (Wiens 1969, Robins 1971, Rotenberry and Wiens 1980, Kahl et al. 1985, Hanson 1994, Bollinger 1995, Mazur 1996, Michaels 1997, Winter 1999, Cully and Michaels 2000), relatively high cover of standing dead residual vegetation (Zimmerman 1988, Sample 1989, Zimmerman 1988, Mazur 1996, Melde and Koford 1996), tall, dense vegetation (Robins 1971; Skinner 1974; Skinner et al. 1984; Clawson 1991; Herkert 1991, 1994*a*), and generally low woody stem densities (Kahl et al. 1985, Hands et al. 1989, Sample 1989, Herkert 1994*a*, Mazur 1996, Winter 1998). Henslow's sparrow habitat also is characterized by a high percentage of grass cover and scattered forbs for song perches (Wiens 1969, Robins 1971, Skinner et al. 1984, Herkert 1994*b*, Winter 1998). Studies in Wisconsin and Illinois have found no apparent preference for native, warm-season vs. tame, cool-season grasses (Sample 1989, Herkert 1994*a*). However, Birkenholz (1973) found this species to be most common in native grasses and to avoid a nearby field of Kentucky bluegrass (*Poa pratensis*) at one site in Illinois. In Missouri, Henslow's sparrows were not present in either tame or native hayfields (Skinner 1975).

Henslow's sparrows may use idle hayfields, Conservation Reserve Program lands, or wet meadows (Hands et al. 1989, Helzer 1996, Koford 1997, Helzer and Jelinski 1999).

Studies have been inconclusive regarding the amount of woody vegetation that will be tolerated by Henslow's sparrows, although it is generally accepted that encroachment by woody vegetation eventually precludes use by this species (Piehler 1987, Smith 1992, Melde and Koford 1996, Pruitt 1996). Several studies have indicated that Henslow's sparrows prefer areas with low density of woody vegetation (Peterson 1983; Kahl et al. 1985; Zimmerman 1988; Mazur 1996; Michaels 1997; Winter 1998, 1999; Cully and Michaels 2000). Densities of tall (>2m) shrubs/trees were 70% higher at unoccupied areas than at occupied areas at one site in northeastern Illinois (Herkert and Glass 1999). However, a different Illinois study found no significant difference in woody stem densities for shrubs <2m tall (Herkert 1994*a*), and a Minnesota study found no significant difference in the number of trees, shrubs, and bushes between areas used and not used by Henslow's sparrows (Hanson 1994). In Wisconsin, a positive correlation was detected between Henslow's sparrow abundance and woody cover <1 m; however, despite this positive correlation, percent woody cover <1 m at occupied sites was low (0.79%), as was total woody cover (1.69%) (Sample 1989). A table near the end of the account lists the specific habitat characteristics for Henslow's sparrows by study.

5.2.3.3 Area requirements: Although individual territories are small (0.18-1.0 ha; Wiens 1969, Robins 1971, Piehler 1987, O'Leary and Nyberg 2000), field size has been identified as an important component of Henslow's sparrow habitat (Bollinger 1991, 1995; Smith and Smith 1992; Herkert 1994*a,b*; Mazur 1996; Swengel 1996). Henslow's sparrows are more likely to be encountered, and densities may be higher, in large grassland areas than in small areas (Herkert 1994*a,b*; Bollinger 1995; Mazur 1996; Swengel 1996; Winter 1996, 1998; Winter and Faaborg 1999), and large grasslands may be needed to support persistent populations (Pruitt 1996). Area was found to be the best predictor of Henslow's sparrow occurrence in grasslands in Illinois and New York (Herkert 1994*a,b*; Bollinger 1995). In Kansas and New York, Henslow's sparrow were observed in areas with ≥30 ha of contiguous grassland (Zimmerman 1988, Smith and Smith 1992, Mazur 1996); in Illinois, the estimated area required for Henslow's sparrows to be detected 50% of the time was >55 ha (Herkert 1994*b*). Although Henslow's sparrows are more common in large fields and occupy them first in spring (Mazur 1996), Henslow's sparrows also show evidence of nesting activity in small (<50 ha) grasslands (Robins 1971; Hanson 1994; Mazur 1996; Winter 1996, 1998). No studies have investigated the relationship between patch size and the rate of brood parasitism by Brown-headed Cowbirds (*Molothrus ater*) on Henslow's Sparrows.

Grassland isolation also may influence the distribution of Henslow's sparrows (Winter 1998). In Missouri, Henslow's sparrows were absent from a 28-ha isolated prairie fragment, but were present in a 16-ha fragment that was 1.6 km from a larger prairie where Henslow's sparrows were present (Hayden 1985). In Missouri tallgrass prairie fragments, density of Henslow's sparrows increased with the total area of grassland in the surrounding landscape and with decreasing distance among grassland patches

(Winter 1998). Although Henslow's sparrows are sensitive to habitat fragmentation, nesting success does not seem to be influenced by fragment size (Winter 1998, 1999; Winter et al. 2000). In Missouri tallgrass prairie fragments, nest success was lower <50 m from a shrubby edge, presumably because of increased mammalian activity and increased mammalian depredation of nests near edges (Winter 1998, Winter et al. 2000). In Illinois, Henslow's sparrows were more inclined to hold territories in the interior of fields than in the 50 m between the interior of the field and the wooded boundary (O'Leary and Nyberg 2000).

5.2.3.4 Brown-headed Cowbird brood parasitism: Although Friedmann and Kiff (1985) suggested that Henslow's sparrows might be a frequent host in some locations, only three known rates of brood parasitism by Brown-headed Cowbirds have been reported. In Missouri, Winter (1999) reported that 5% of 59 nests were parasitized. In Oklahoma, 8% of 24 nests were parasitized (Reinking et al. 2000). In Ontario, 8% of 12 nests were parasitized (Peck and James 1987).

5.2.3.5 Breeding-season phenology and site fidelity: Henslow's sparrows arrive on their breeding grounds from late March to late April, and nest from May to mid-August, although nests with young have been found as late as September (Graber 1968, Robins 1971, Michaels 1997, Winter 1998). In southwestern Missouri, two nest initiation peaks occurred in late May and in mid-June (Winter 1999). In Maryland, five banded adult males exhibited site fidelity by returning to a prior year's breeding area (Skipper 1998). Fall migration begins in September, and most birds have vacated the breeding grounds by late October (Graber 1968, Robins 1971).

Henslow's sparrows apparently will re-nest after a first nest fails, and nests found with eggs in mid-August or dependent young in September suggest that the species may be double-brooded (Graber 1968). In southwestern Missouri, Winter (1998) found that Henslow's sparrows were double-brooded. In southern Michigan, Henslow's sparrows commonly raised two broods per nesting season (Robins 1971), whereas, in Wisconsin, second broods were uncommon (Wiens 1969). In Maryland, fledglings were found in late July, which suggested that double-broodedness had occurred (Skipper 1998).

5.2.3.6 Species' response to management: Periodic disturbance may be necessary to maintain suitable habitat for Henslow's sparrows, although disturbance reduces habitat available to Henslow's Sparrows for one or two breeding seasons (Zimmerman 1988, Herkert 1994*a*, Melde and Koford 1996). Henslow's sparrows generally avoid areas that have been recently disturbed by burning, mowing, or grazing because of the removal of standing dead vegetation (Eddleman 1974, Skinner et al. 1984, Zimmerman 1988, Volkert 1992, Herkert 1994*a*). Henslow's sparrows are generally absent from areas during the first growing season following prescribed fire (Eddleman 1974, Hayden 1985, Zimmerman 1988, Clawson 1991, Schulenberg et al. 1993, Herkert 1994*a*). In Kansas, Henslow's sparrows were absent on annually burned tallgrass prairie (Zimmerman 1997), and were present on areas 2-3 growing seasons postfire significantly more than areas 0-1 and >4 growing seasons postfire (Michaels 1997). In Wisconsin, Henslow's sparrows were most abundant on a restored tallgrass prairie 2-3 yr postfire (Volkert

1992). Henslow's Sparrows occupied only the unburned half after half of the prairie was burned a second time. In Oklahoma and Kansas, Henslow's sparrows avoided nesting in spring-burned tallgrass prairie (Reinking and Hendricks 1993, Schulenberg et al. 1993). In Illinois, densities were usually 20-50% lower in areas during the second growing season postfire than in areas three or more growing seasons postfire (Herkert 1994*a*, Herkert and Glass 1999). No differences were found among densities 3-5 growing seasons postfire (Herkert and Glass 1999). In Missouri tallgrass prairies, Henslow's sparrow densities were reduced in the first growing season postfire, but no difference in densities was found 2-4 growing seasons postfire (Swengel 1996, Winter 1998). However, Henslow's sparrows have been found breeding on areas in Missouri that were burned the same spring (Winter 1998, 1999). Nests in areas burned the same spring were placed close to the ground within large clumps of grass.

In Illinois, mowing tended to reduce but not eliminate Henslow's sparrows in the growing season immediately following mowing (Herkert 1994*a*). However, timing of mowing the previous year may influence whether or not Henslow's sparrow occupy a particular field. In New York, fields mowed late the previous year were avoided at the beginning of the breeding season, but some were occupied later in the season once vegetation has recovered (Mazur 1996). However, in an earlier New York study, Henslow's Sparrows bred in pastures that had been mowed in late July to August 1-6 yr earlier (Smith and Smith 1992). Henslow's sparrows continue nesting late (i.e., August) into the summer (Potter 1915, Reinking and Hendricks 1983) and abandon fields once they are mowed (George 1952, Graber 1968, Hayden 1985). Many nests and fledglings are destroyed by mowing during the breeding season (M. Winter, University of Missouri, Columbia, Missouri, pers. comm.). Therefore it is recommended that mowing not be allowed in areas with nesting Henslow's sparrows until after the breeding season (about 15 August). Even though late-season (early August) mowing can destroy Henslow's sparrows nests (Potter 1915), conservation mowing in Missouri (one annual cut occurring after mid-July) was found to result in higher densities of Henslow's sparrows than in burned areas (Swengel 1996). In Missouri tallgrass prairie fragments, Henslow's sparrow densities were lower in areas hayed the previous year than those hayed two years earlier (Winter 1998).

Grazing also influences Henslow's sparrows distribution and abundance. In general, moderately to heavily grazed areas are not used by Henslow's sparrows (Peterson 1983; Skinner et al. 1984; Zimmerman 1988; J. R. Herkert, Illinois Endangered Species Protection Board, Springfield, Illinois, *unpublished data*). At Konza Prairie in Kansas, Henslow's sparrows were not encountered until grazing had been halted for 2 yr (Zimmerman and Finck 1982). However, Henslow's sparrows have been reported to occupy areas that are lightly grazed (Skinner et al. 1984, Swengel 1996). In Missouri, Henslow's Sparrow densities were highest on lightly grazed (vegetation height >30.4 cm) pastures, followed by idle pastures; they were not found on heavily grazed (vegetation height ≤10.2 cm) pastures (Skinner 1975). In New York, Henslow's Sparrows were found on lightly grazed pastures occupied annually by cattle from 15 May to 15 October. These pastures also had been mowed in late July to August in the previous year (Smith and Smith 1992). In southwestern Wisconsin, Henslow's sparrows

were nearly equally abundant in rotationally grazed pastures, continuously grazed pastures, and ungrazed pastures (Temple et al. 1999). Ungrazed grasslands were neither mowed nor grazed from 15 May to 1 July. Continuously grazed sites were grazed throughout the summer at levels of 2.5- 4 animals/ha. Rotationally grazed pastures, stocked with 40-60 animals/ha, were grazed for 1-2 d and then left undisturbed for 10-15 d before being grazed again; pastures averaged 5 ha. All sites were composed of 50-75% cool-season grasses, 7-27% legumes, and 8-23% forbs.

Henslow's sparrow populations tend to increase through the summer (Mazur 1996, J. R. Herkert, Illinois Endangered Species Protection Board, Springfield, Illinois, pers. obs.) and late-arriving (after 31 May) birds may use areas typically avoided by early-arriving birds, such as burned or mowed areas (Skinner et al. 1984; Mazur 1996; M. Winter, pers. comm.)."

5.2.4 Habitat Distribution on Fort Riley

Surveys for singing male Henslow's sparrows have occurred on Fort Riley since 1994. They indicate that a large population of Henslow's sparrows has been and continues to present on the installation. Maneuver Areas H, K and O have yielded the highest estimated numbers. Incidental observations of individuals and nests have been reported from Training Areas A, B, H, K, and P. The continued presence of the Henslow's sparrow on Fort Riley is most likely related to the amount and intensity of prescribed burning and wildfires that maintain the tallgrass prairie. It is Fort Riley's goal to consider the needs of this species when developing burning priorities, and to retain 6,000-7,000 ha of unburned tallgrass prairie while achieving a burning cycle of every three to five years.

5.3 CONSERVATION GOALS

1) Survey the population of Henslow's sparrows on Fort Riley.

2) Protect, maintain, and enhance habitat on Fort Riley.

3) Provide long-term monitoring of populations on Fort Riley.

4) Initiate conservation partnerships with adjacent landowners.

5.4 MANAGEMENT GUIDELINES AND ACTIONS

1) Management Guidelines

   a) Determine size of breeding population of Henslow's sparrows.

   b) Protect, maintain, and improve suitable nesting habitat.

   c) Minimize the risk of Henslow's sparrow injury and mortality.

d) Provide annual long-term monitoring of population trends.

2) Management Goals and Actions

5.4.1 Determine Size of Breeding Population: Christmas Bird Count data for this species indicate it has experienced significant declines range wide over the past 25 years, and of 30 species of nongame migratory birds studied by the Cornell Laboratory of Ornithology, the Henslow's sparrow was rated as one of two most in danger of extinction (Butcher 1989). Additional status information from throughout the range is, therefore, of critical importance.

5.4.1.1 Goal. Determine the size of the breeding population of Henslow's sparrows on Fort Riley.

Action. All tallgrass prairie, both native and go-back areas, will be systematically surveyed during the breeding season, roughly May 1 to August 31. Any quantitative survey methodology, such as used in Breeding Bird Surveys is acceptable, as long as adequate coverage of the appropriate habitat results in locating and identifying nests or breeding pairs. The nest is generally well hidden on the ground under a grass clump that overhangs and covers the nest (Thompson and Ely 1989), making location difficult even after locating a singing male. Nesting territories will be marked on area maps, and this information can be used for protection/management as well as in comparisons of annual population changes.

5.4.2 Protect, Maintain, and Improve Nesting Habitat: Tallgrass prairie is abundant on Fort Riley, with habitat suitability dependent upon the absence of mowing or burning for two to three years, allowing a build-up of thick dead vegetation. Training maneuvers which destroy tallgrass and create openings for annual weed invasion may be detrimental to this species. The presence of sericea lespedeza may also negatively affect this species.

5.4.2.1 Goal. Determine acreages of Henslow's sparrow nesting habitat for protection and maintenance of the species habitat.

Action. Results of the breeding population survey will help determine how many acres of grassland are currently being utilized by the species for reproduction. Tracts of land that are being utilized for nesting will be designated as Henslow’s sparrow breeding habitat. This many acres of grassland will be maintained in a state of older growth to contain dense, rank grass. The Henslow's sparrow exhibits poor site fidelity, probably in response to the unpredictability of its specific habitat requirements in any given location from year to year (Zimmerman 1987). Therefore, specific locations of acres selected for habitat protection may vary annually, depending of habitat manipulations of any given tract of land.

5.4.2.2 Goal. Maintain and improve nesting habitat in suitable condition for successful reproduction by Henslow's sparrows.

Action. Habitat will be maintained or enhanced by periodically setting back succession to maintain dense herbaceous vegetation with little woody invasion. Controlled burning or mowing will be conducted at the recommended at intervals of three to four years (Hands et al. 1989, Zimmerman 1988). Management practices will strive to provide as much suitable nesting habitat as possible, but always provide enough suitable nesting habitat to meet the minimum field size required for nesting to occur (greater than 50 ha). The presence of sericea lespedeza will be monitored and controlled to the extent feasible.

5.4.2.3 Goal. Initiate conservation partnerships with adjacent landowners.

Action. Survey adjacent private properties that contain suitable habitat or potential habitat for the Henslow's sparrow. Private lands adjacent to Fort Riley contain some quality tallgrass prairie, low quality prairie and tilled ground. These private lands will be considered as an opportunity to provide additional quality prairie to support the local population of Henslow's sparrows through Cooperative Agreements. A private lands initiative will be implemented in cooperation with the USFWS to promote tallgrass prairie stewardship in the region. Adjacent lands will be evaluated for the potential to improve or maintain habitat for Henslow's sparrows and other grassland birds through mutual agreements such as woody plant removal, noxious weed control, conservation grazing and prescribed burning.

5.4.3 Minimize Human-Induced Injury: Pesticides can reduce invertebrate densities and could therefore be detrimental in areas with breeding Henslow's sparrows. The goal of minimizing human-induced injury can best be attained by protecting their food source.

5.4.3.1 Goal. Protect food source from chemical impact.

Action. The storage and usage of all pesticides, including insecticides, herbicides, and rodenticides, on Fort Riley shall be conducted in strict accordance with label directions and restrictions. All general use and military chemicals on Fort Riley shall be used, stored, and disposed of in accordance with directions, restrictions and/or guidelines established by the manufacturer and/or Department of the Army. Use of integrated pest management, such as mechanical and biological control, will be used to the extent practical.

5.5 LONG TERM INVENTORY AND MONITORING PLAN

The breeding population of Henslow's sparrows on Fort Riley and the surrounding area will be monitored continuously for the next 10 years or more, in an attempt to determine population size, growth, and response to habitat manipulation. Determining the size of the initial nesting population is specified in the first action discussed above, and will provide a baseline against which to compare subsequent population trends. Any

quantitative survey methodology is acceptable, as long as it accurately counts or estimates populations and is replicable annually.

5.6 ESTIMATE OF TIME, COST, AND PERSONNEL NEEDED

It is estimated that accomplishing the tasks involved in the management of the Henslow's sparrow on Fort Riley will require approximately 80 staff-days annually. The time involvement of the various goals and actions is provided as follows:

Determine and continuously monitor the size of the breeding population. This will require quantitative surveys during May, June, July and August to determine breeding populations. 20 staff-days.

Protect, maintain, and improve nesting habitat. This will require determinations of site improvement needs and availability, habitat manipulations including tree clipping, and prescribed burning, and monitoring of effects. Monitor and control sericea lespedeza. 40 staff-days annually.

Protect food source against chemical impacts. This will require notification to military training personnel, advising them of restrictions on chemical use; also monitoring and enforcement of compliance. 10 staff-days annually.

Information and Education. This will involve information dissemination to the Fort Riley Command Group and military units regarding protection for sensitive grassland habitat. 10 staff-days annually

5.7 CHECKLIST OF TASKS

_____ Survey appropriate habitat for breeding pairs and non-breeding individuals of Henslow's sparrow; locate on area maps. Section 5.4.2.1

_____ Conduct controlled burning and/or mowing on a 3-4 year rotational basis on selected grasslands, to maintain existing nesting habitat or to restore or create new or degraded habitat. Section 5.4.2.2

_____ Conduct tree removal in areas of known Henslow’s sparrow populations or areas that have potential for Henslow’s sparrow populations. Section 5.4.2.2

_____ Protect food source from chemical impacts utilizing label and Army restrictions and guidelines; incorporate integrated pest management principles to avoid the use of pesticides. Section 5.4.3.1

_____ Conduct annual surveys of breeding and non-breeding Henslow's sparrow populations throughout suitable habitat. Section 5.4.1.1

_____ Provide information and education to military leaders and units regarding conservation initiatives for Henslow's sparrows. Section 5.6

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Appendix 1.
Construction Methodology for Hardened, Low Water Fords

Project Background.

The Fort Riley Military Installation is headquarters for the 24th Infantry Division (Mechanized) and its associated support units. Primary training functions at Fort Riley are mechanized infantry training and firing. Other training functions at Fort Riley include artillery and infantry battalion training. Infantry battalions conduct mortar firing as well as field maneuvers.

Vehicle movement in all weather conditions is integral to mission accomplishment on Fort Riley. Light and heavy armor vehicles are driven cross-country when simulating a wartime maneuvering environment. Cross-country movements may require the vehicles to pass through small and large ephemeral and perennial streams. Damage occurs to the streambed by vehicles during the crossing. The number of vehicles using a crossing site, site-specific physical characteristics, and the timing of precipitation events determine the amount of damage to the stream. Typical damage includes erosion gullies forming in the approaches to the streams, silt-laden pools developing at the crossing, and poorer water quality resulting from increased sedimentation and turbidity. Over time the gullies deepen, the pools enlarge and a deep, silty layer occurs at the pool's bottom. All make the crossing impassable, and a new crossing site is found. Usually new crossings are established adjacent to the impassable crossing.

The "Hardened Stream Crossing Project" was proposed and initiated to improve stream-crossing sites, discourage the practice of multiple stream crossing sites in a localized area, and improve stream habitat conditions.

Project Description.

Hardened, Low Water Ford Construction

1. Direct adverse impacts to Topeka shiner reproduction will be minimized because no construction activity will take place at crossing sites with flowing water between the dates of May 15 and July 31, inclusive, except in emergency situations.

2. Approaches on each side of the crossing will be cut where necessary such that a grade of ten percent is not exceeded. The approaches will be a minimum of eighteen feet wide (thirty feet on tank trails) and extend from the ford a minimum of one hundred feet.

3. A layer of geotextile fabric will be laid down on the surface of the graded approaches. A one-foot layer of 8-12 inch diameter rock will be applied

to the geotextile. An additional six-inch layer of 3-4 inch diameter top rock will be used on approaches that occur on tank trails to serve as a wearing surface. Top rock used during construction shall contain a minimal amount of fines.

4. V-ditches will be constructed on both sides of the approaches to provide drainage for them. The side slopes of the V-ditches will not be less than 3:1. A layer of riprap will be applied to the drainage ditches of approaches with grades that exceed five percent.

5. Methods used to construct low water fords will be dependent upon the typical water-flow conditions expected for each site.

a. Construction will occur during no flow conditions at ephemeral stream crossing sites. Soil in the stream at the ford site will be excavated to a minimum depth of two feet or until bedrock or a clay pan is reached. The minimum width of the excavation will be eighteen feet. The length of the excavation will equal the width of the stream channel plus ten feet. A geotextile fabric will be laid down to cover the surface of the excavated area. The excavated area will then be filled with 8-12 inch diameter rock. Rock will be added and compacted until the original streambed elevation is reached. A layer of 3-4 inch top rock will be used on fords that occur on tank trails to fill voids in the larger rock. Materials used shall be free from excessive amounts of fines.

b. A backhoe will be used to excavate a hole in streams with perennial water flow. The holes that are created will have riprap of 24-inch diameter or larger emptied into them. Large vehicles will drive across this material forcing it into the ground. The large riprap will be emptied into the site until the vehicles are no longer able to force the rocks deeper, i.e., the riprap is at bedrock or a clay pan.

6. Soil removed during construction that is suitable for reuse may be utilized to build berms and diversion ditches. Soil removed during construction that is not used for berm or diversion ditch construction shall be spread over a relatively level area outside of the construction area and at least 50 feet from a stream channel.

7. A motor grader will improve or develop a trail in locations where trails leading to stream crossings are inadequate for travel by construction vehicles. All transport roads created during construction shall be tilled and planted to grass after ford construction is complete.

8. Best management practices for erosion control (e.g., hay bales, silt fences, etc.) will be implemented and maintained throughout the duration of all project activities located in runoff areas to streams. Temporary seeding and/or mulching will occur within all stream runoff areas as soon as grading allows, followed by permanent seeding of native or brome grasses as soon as practical.

9. Additional stream crossing sites that were created by military maneuvers but will no longer be needed with the availability of hardened stream crossings will be reclaimed and remediated, or protected from further use and allowed to naturally recover.

10. Grubbing and stream channelization will be minimized.

Data on Stream Crossings.

Fort Riley has collected data to evaluate water quality at both hardened and earthen fords. Data show an increase in total solids, total suspended solids, and turbidity in downstream water following traffic across both hardened and earthen fords. However, the average increase in total solids, total suspended solids, and turbidity is almost twenty times higher in earthen fords as compared to hardened ones (Sample 1996). Hardened fords were found to have higher downstream turbidity readings than earthen fords under undisturbed (no vehicle) conditions (Sample 1996).

Project Effects.

A. Expected Beneficial Effects.

1. Reduce lost military training time due to vehicles stuck in stream crossing.
2. Reduce equipment damage resulting from vehicles crossing degraded sites.
3. Reduce site degradation resulting from multiple stream crossings.
4. Reduce risk of human injury.
5. Reduce total solids, total suspended solids, and turbidity in the water resulting from vehicle movements across streams.
6. Reduce erosion occurring on approaches to fords.
7. Overall stream quality will improve and benefit Topeka shiners.

B. Potential Adverse Effects.

1. An increase in total solids, total suspended solids and turbidity may occur downstream during construction of the hardened low water fords.
2. A slight increase in water turbidity has been found to occur downstream from hardened fords under undisturbed conditions as compared to earthen fords.
3. Topeka shiners, or their eggs, may be inadvertently destroyed during construction.

Alternative Actions

The alternative to the proposed action is to not develop hardened fords. Past practices of uncontrolled crossing of streams at any tactically suitable location would likely result. Such practices lead to increased stream bank degradation, increased streambed degradation, increased damage to the stream's vegetative filter strips, increased soil erosion, increased water turbidity, and increased sedimentation in the stream. Water quality in streams being crossed would diminish to the detriment of the Topeka shiner and other native aquatic organisms. Additionally, delays in the military mission would result from vehicles becoming stuck during attempted stream crossings, additional vehicle and equipment damage would occur, and soldiers would be exposed to a higher risk of injury during training.

Literature Cited.

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